

Public Education and Outreach on Storm Water Impacts

Regulatory Text

You must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

Guidance

You may use storm water educational materials provided by your state; tribe; EPA; environmental, public interest, or trade organizations; or other MS4s. The public education program should inform individuals and households about the steps they can take to reduce storm water pollution, such as ensuring proper septic system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil and household hazardous wastes. EPA recommends that the program inform individuals and groups how to become involved in local stream and beach restoration activities, as well as activities that are coordinated by youth service and conservation corps or other citizen groups. EPA recommends that the public education program be tailored, using a mix of locally appropriate strategies, to target specific audiences and communities. Examples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling and watershed and beach cleanups. In addition, EPA recommends that some of the materials or outreach programs be directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant storm water impacts. For example, providing information to restaurants on the impact of grease clogging storm drains, and to garages on the impact of oil discharges. You are encouraged to tailor your outreach program to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as any special concerns relating to children.

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Public outreach/education for homeowners

Lawn and Garden Activities

Public Education and Outreach on Storm Water Impacts

Description

Lawn and garden activities can result in contamination of storm water through pesticide, soil, and fertilizer runoff. Proper landscape management, however, can effectively reduce water use and contaminant runoff and enhance the aesthetics of a property. Environmentally friendly landscape management can protect the environment through careful planning and design, routine soil analysis, appropriate plant selection, use of practical turf areas, water use efficiency, use of mulches, and appropriate maintenance.

Additional activities that benefit water resources include maintaining healthy plants and lawns and composting lawn wastes. Healthy plants are less susceptible to diseases and insects and therefore require minimal use of pest control measures. To promote healthy plants, it is often beneficial to till composted material into the soil. Recycling of garden wastes by composting is also effective at reducing waste, although compost bins and piles should not be located next to waterways or storm drains because leachate from compost materials can cause contamination.



A typical composting bin (Source: Alameda County Waste Management Authority, 2001)

It is important for municipalities to set a good example for residents. The city of Seattle, Washington, and King County, Washington, voluntarily decided to phase out the use of dozens of pesticides to encourage the use of less-toxic alternatives by municipal crews (Johnson, 1999). This decision followed criticism from local residents because the municipalities were recommending that residents avoid using weed killers or harmful pesticides on yards as a way to help save the chinook salmon, which was recently listed as an endangered species. While making these recommendations, municipal crews were regularly using herbicides in parks and along roadsides. Based on a study undertaken by the city of Seattle, the municipalities will phase out the use of Tier 1 chemicals, which are deemed most hazardous. There will be exceptions to the phase-out, but only when there are major health and safety concerns from pest outbreaks. Environmental groups support the phase-out and hope to see zero pesticide use in the future. Opposition to the phase-out is mainly by groups representing agriculture, landscaping, and timber interests, who warn that overwhelming weed, mosquito, and rat problems will result from the pesticide phase-out.

Applicability

Many environmentally friendly lawn and garden activities can be implemented for any municipal property. Municipalities can encourage residents to use the same practices in their own yards. These practices include landscape planning; integrated pest management; planting indigenous species; soil testing; and reduction, elimination, or judicious use of fertilizers and pesticides. Planting drought-resistant plants and using water conservation practices can be especially useful in areas of low rainfall. Areas of high rainfall experience more erosion, so protecting exposed soils with vegetation and mulches is of particular importance in these areas.

Implementation

The following guidelines describe ways in which municipalities can promote environmentally friendly landscaping techniques:

General Programs. A public education program such as the Florida Yardstick can help landowners understand the value of good yard practices. The Florida Yardstick was designed as part of the Florida Yards & Neighborhoods Program (University of Florida Cooperative Extension Service, no date). A 19 x 37 poster of a yardstick helps landowners evaluate their yards by gaining credits for various practices (subjects include yard pests, recycling, mulch, fertilizing, wildlife, and selecting the appropriate plants). The credits are in the form of inches, and the best yards will grow to 36 . When the goal of 36 is met, the landowner receives a certificate for their yard. More information about the Florida Yardstick can be found at www.agen.ufl.edu/~wq/fyn/check.html.

Planning and Design. It is important to emphasize that property owners develop a landscape plan that utilizes the natural conditions of the property. For example, the regional and climatic conditions of the site, existing vegetation, topography, intended uses of the property, and the grouping of plants by their water needs are all important considerations in designing a site that promotes natural vegetation growth while minimizing water loss and contamination. Residents and municipal crews can partner with local nurseries and irrigation and lawn services to identify the appropriate landscape design for a specific site and to offer environmentally friendly practices to homeowners.

Soil Analysis and Improvements. Residents and municipal crews should be encouraged to test soils every 3 to 4 years to determine the amount of nutrients necessary to maintain a healthy lawn. Municipalities can encourage home and garden centers to market and sell soil test kits so that property owners can perform such tests on their own. Soil analyses can also be performed by a local extension service, and representatives from this agency can then provide suggestions for improving the ability to support specific types of vegetation and retain water at a specific site.

Appropriate Plant Selection. Encourage property owners and municipal crews to choose local or regional plants when developing an environmentally friendly landscape. Indigenous plant species are generally more water efficient and disease resistant. Furthermore, exotic plants can potentially impact local waterways. Local nurseries can assist in choosing appropriate regional plant species.

Practical Turf Areas. Property owners and municipal crews should be encouraged to plant non-turf areas where possible, because lawns require more water and maintenance than wildflowers, shrubs, and trees. If turf is used, it is important to select a type of grass that can withstand drought and that becomes dormant in hot, dry seasons. Local nurseries can provide property owners and municipal crews with assistance when selecting grass types. In addition, when maintaining lawns, the grass should not be cut shorter than 3 to 4 inches in height, and mulched clippings should be left on the lawn as a natural fertilizer.

Efficient Irrigation. Much of the water that is applied to lawns and gardens is not absorbed by the vegetation. When water is applied too quickly, it is lost as runoff along with the top layers of soil. To prevent this, it is important to encourage the use of low-volume watering approaches such as drip-type or sprinkler systems. In addition, encourage property owners and municipal crews to water plants only when needed to enhance plant root growth and avoid runoff problems.

Use of Mulches. Mulches help retain water, reduce weed growth, prevent erosion, and improve the soil for plant growth. Mulches are usually wood bark chips, wood grindings, pine straws, nut shells, small gravel, or shredded landscape clippings. Property owners should be encouraged to use mulches and should be informed of the benefits of these materials. Additionally, municipalities can start a program to collect plant materials from municipal maintenance activities as well as yard waste from property owners. These materials can be converted to mulch and used at municipal properties or redistributed to property owners.

Fertilizers. Property owners and municipal crews should be discouraged from using fertilizers, or if they are used, from over-applying them. Municipalities can recommend less-toxic alternatives to commercial fertilizers, such as composted organic material.

Municipalities can also recommend practices to reduce the amount of fertilizer entering runoff. For example, slow-release organic fertilizers are less likely to enter storm water. Application techniques, such as tilling fertilizers into moist soil to move the chemicals directly into the root zone, reduce the likelihood that the chemicals will be mobilized in storm water. Timing is also important: Warm season grasses should be fertilized in the summer, in frequent and small doses, while cool season grasses should be fertilized in the fall. Also, fertilizer should not be applied on a windy day or immediately before a heavy rain. Municipalities can recommend that property owners apply fertilizer at rates at or below those recommended on the packaging or should apply fertilizer based on the needs of the soil (as determined by a soil test). Safe disposal of excess fertilizer and containers should be encouraged. (See the [Proper Disposal of Household Hazardous Waste](#) fact sheet.)

Pesticides. Like fertilizers, pesticides should be used on lawns and gardens only when absolutely necessary. Pesticide use can be avoided entirely by selecting hearty plants that are native to the area and by keeping them healthy. It is also important to identify any potential pests to determine if they are truly harmful to the plant. The pests should always be removed by hand if possible—chemical pest control should be used only if other approaches fail. If it is necessary to use chemical pesticides, the least toxic pesticide that targets the specific pest in question should be chosen (i.e., boric acid, garlic, insects, etc). If a pesticide is labeled with the word "caution," it is less toxic than one labeled "warning," which is, in turn, less toxic than one that is labeled "danger/poison."

It is also important to follow the label directions on the pesticide. Encourage property owners and municipal crews to wear the appropriate protective equipment listed on the label when working with organophosphate insecticides or concentrated sprays or dusts. Also encourage them to read and follow all safety precautions listed on pesticide labels and to wash their hands and face before smoking or eating. Tools or equipment that were used to apply or incorporate pesticides should always be rinsed in a bucket and the rinse water applied as if it were full-strength pesticide. Any unused pesticide can be saved and disposed of at a household hazardous waste collection. (See the [Proper Disposal of Household Hazardous Waste](#) fact sheet.)

The following web sites provide education and information regarding safe pesticide use and disposal:

- University of Nebraska's *Pesticide Education Resources* at a href="http://pested.unl.edu"><http://pested.unl.edu>.
- University of Illinois College of Agricultural, Consumer, and Environmental Sciences' *Pesticide Safety Education* at [<http://www.aces.uiuc.edu/~pse/welcome.html>].
- Pennsylvania State University Pesticide Education Program's *Pesticide Urban Initiative* at <http://urbanpested.cas.psu.edu>.
- Washington State University's *Pesticide and Environmental Stewardship* at <http://pep.wsu.edu>.
- National Coalition Against the Misuse of Pesticides' *Beyond Pesticides* at <http://www.beyondpesticides.org>.
- Cornell University's *Pesticide Management Education Program* at <http://pmep.cce.cornell.edu>.
- The Pesticide Education Center's web site at <http://www.igc.org/pesticides>.

Ordinances. Municipalities can use ordinances as a means of controlling or preventing pesticide usage in the future. For example, the city of Arcata, California, created an ordinance that officially eliminated the use of pesticides on all city properties (Californians for Alternatives to Toxics, 2000). This ordinance followed a 14-year moratorium on pesticides in which the city council and a citizen's task force researched less-toxic alternatives to pesticide use. Municipal workers adapted to the moratorium by devising innovative pest control methods, such as covering the infield dirt in the baseball stadium with tarps between games to prevent weed growth. Other methods that Arcata crews used to prevent weeds included planting local plant species adapted to the city's climate; timely mowing, irrigating, weeding, and thatching lawns; and performing regular street maintenance such as sweeping and crack sealing. The ordinance also mandates the creation of a pest control management plan that will be linked to the city's storm water discharge program and includes a public education component. The text of the ordinance can be found at www.alternatives2toxics.org.

Benefits

There are several benefits to environmentally friendly landscape design. First, proper site planning can reduce maintenance requirements by selecting native species and locating plants in areas where conditions are optimal for growth requirements. Soil analysis can prevent overapplication of fertilizers by eliminating uncertainty regarding existing soil fertility. Careful selection of turf can minimize watering and fertilizer requirements by choosing grasses that thrive in a particular climate. Minimizing turf area by replacing it with ground cover, shrubs, and trees reduces mowing requirements, which subsequently reduces air, water, and noise pollution. Efficient watering practices reduce pollutant transport and erosion from runoff of wasted water. Mulches stabilize exposed soils, prevent growth of nuisance vegetation, and improve soil fertility through the slow release of nutrients from decomposition. Finally, the reduction or judicious application of pesticides and fertilizers reduces the probability of contamination, while ensuring that the maintenance requirements of vegetation are being met.

Limitations

There are virtually no limitations associated with implementing environmentally friendly lawn and garden practices. Some practices are more applicable in certain climates (for example, there is little need for irrigation practices in areas of very high rainfall), but in general, all practices are low cost and relatively easy to implement. With guidance from a local environmental agency, extension service, or nursery, proper decisions can be made regarding which practices are best for the site in question.

Effectiveness

Using proper landscaping techniques can effectively increase the value of a property while benefiting the environment. Attractive, water-efficient, low maintenance landscapes can increase property values between 7 and 14 percent (USEPA, 1993). These practices also benefit the environment by reducing water use; decreasing energy use (because less water pumping and treatment is required); minimizing runoff of storm and irrigation water that transports soils, fertilizers, and pesticides; and creating additional habitat for plants and wildlife.

Costs

Proper landscape activities are very cost effective. Promoting the growth of healthy plants that require less fertilizer and pesticide applications minimizes labor and maintenance costs of lawn and garden care. Using water, pesticides, and fertilizers only when necessary and replacing store-bought fertilizers with compost material can increase the savings for a property owner as well as benefit the environment.

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Water Conservation Practices for Homeowners

Public Education, and Outreach on Storm Water Impacts

Description

Water use has soared in recent years. In many parts of the United States, the limited availability of drinking water has made water conservation practices mandatory. With water consumption at an all-time high, the costs of water and sewer services continue to climb. The good news, however, is that widespread reduction in water consumption could limit the need for new or expanded water and sewage treatment plants.



Fixing a leaky sink can help conserve water (Source: Louisiana USA, 1997)

Applicability

According to the Chesapeake Bay Program and the Alliance for the Chesapeake Bay (1993), only about 4 of the estimated 100 gallons of water that each person uses daily is actually necessary. Water usage in the home can easily be reduced by 15 to 20 percent—without major discomfort—by implementing a program to conserve water in the home. Municipalities should establish a public education and outreach program to demonstrate to homeowners that by making minor changes in water use habits, each household can reduce its water consumption while saving money on water and sewage bills.

Implementation

Municipalities can help their homeowners conserve water through community education efforts. For example, a municipality can establish a Check For Leaks program that instructs homeowners how to determine if their plumbing fixtures (faucets, toilets, hoses, and pipes) are leaking. Even a leak as small as a 1/32-inch opening can waste approximately 6,000 gallons of water per month. A continuous drip from a faucet wastes about 20 gallons of water per day. Toilet leaks are usually silent but waste up to 200 gallons of water each day. Recommend that homeowners check water meters when no water is being used. For example, they can record the number on the meter prior to leaving for a trip and then check the meter again upon return. Also, the position of the meter can be marked and checked. If the needle moves or values change, there is a leak present. Municipalities should emphasize to the homeowner the benefits that can be realized from this type of program, such as lower water utility bills and reduced municipal costs for sewers and wastewater treatment. Emphasize that if leaks are detected, it is important for homeowners to repair them immediately. A Check For Leaks program can be advertised in a utility insert, community newsletter, or mass mailing campaign.

Municipalities can encourage good water use habits by making citizens aware of daily activities that consume a large volume of water. Some water conservation practices that can be recommended include:

- Run the dishwasher and laundry machines only with full loads. Use the shortest wash and rinse cycles and the lowest water level setting possible. Avoid the permanent press cycle, which uses an additional 10 to 20 gallons of water.
- When hand-washing dishes, do not let the water run continuously.
- Avoid using garbage disposal systems.
- When buying a new washing machine, choose a suds-saver model.
- In the bathrooms, place two half-gallon plastic bottles filled with water in the toilet tank to reduce the amount of flush water used.
- Take shorter showers and use a water-conserving showerhead (less than 2.5 gallons per minute) rather than taking baths, which use 30 to 50 gallons of water.
- When shaving, brushing teeth, or washing your face, do not let the water run continuously.
- When washing your car, use a bucket, and wash and rinse sections individually. Use a high-pressure, low-volume hose with a nozzle.
- Water the lawn only when absolutely necessary. More water is consumed using sprinkler and irrigation systems than if a hand-held hose is used (International Turf Producers Foundation, no date). (Trickle irrigation systems and soaker hoses are 20 percent more efficient than sprinklers.)
- Water lawns only during the coolest time of day to avoid evaporation of the water.

There are many resources for water conservation information, including the following:

- The Groundwater Foundation is a nonprofit organization dedicated to informing the public about groundwater. One of their education programs, Groundwater Guardian, attempts to encourage communities to begin groundwater awareness and protection activities. When communities participate in this program, the Groundwater Foundation supports the communities in their efforts and recognizes their achievements. Communities that participate form a Groundwater Guardian team, consisting of citizens, business and/or agricultural representatives, educators, and local government officials. This team develops Result-Oriented Activities (education and awareness, pollution prevention, public policy, conservation, and best management practices) to address the community's groundwater protection concerns. An annual conference allows teams from all around the country to exchange success stories and ideas (www.groundwaterfoundation.org/index.htm).

- The American Water Resources Association (2001) sponsors *WaterWiser: The Water Efficiency Clearinghouse* (www.waterwiser.org), which provides links to books, articles, and web sites related to water conservation. Topics include conservation tips, drought information, public education, irrigation, landscaping, water reuse/recycling, efficient fixtures/appliances, water savings calculators, water-related organizations and agencies, and links to state and local water conservation web sites.
- The Rocky Mountain Institute (no date) created a resource for household water efficiency that contains guidance for homeowners, utilities, and civic groups. Especially useful for municipalities is the page entitled *Civic Action: Promoting Water Efficiency, Protecting Rivers* (www.rmi.org/sitepages/pid123.asp), which provides links to information that can help watershed groups and municipalities inform the public about ways they can reduce water use in the home.
- The Chesapeake Bay Program (2000) presents information on water conservation practices at a web site called *Ways You Can Help the Bay*, which is located at www.chesapeakebay.net/helpbay.htm.

Benefits

For the citizen, the greatest benefit of water conservation in the home is cost savings. By reducing the amount of water used, monthly water bills are reduced. If homes are served by septic systems, reducing water use reduces the amount of wastewater to be treated, thereby minimizing strain on the system and improving pollutant removal performance. For the municipality, a successful water conservation campaign can help to reduce the frequency of sanitary sewer surcharges, reduce the load on wastewater treatment facilities, and reduce the need to expand the sanitary sewer system.

Limitations

It is sometimes difficult to change the habits of the public. Some people value long showers and strong water pressure. Others might have older appliances and plumbing that are difficult to retrofit with water-saving devices. Still others might be reluctant to change lawn-watering practices because they like the low-effort sprinkler or irrigation systems and don't want to water by hand. However, in many cases, people are not aware that alternative practices and products are available that only minimally impact comfort and convenience, if at all. Education programs should target this latter category of people who may be willing to change their habits when they are made aware of alternatives.

Effectiveness

By following these suggested water conservation measures, water use in the home can be reduced by 15 to 20 percent (Chesapeake Bay Program, 1993). The cumulative effects of using water conservation practices can significantly reduce the burden on water storage, purification, distribution, and treatment facilities.

Cost

Water conservation is not only "environmentally friendly," but it is also very economical. Reducing water use can amount to substantial savings on monthly sewer, energy, and water bills. When hot water use is reduced, less energy is required to heat the water. Consequently, gas and electric bills will be reduced as well.

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Proper Disposal of Household Hazardous Wastes

Public Education and Outreach on Storm Water Impacts

Description

Many products found in homes contain chemical ingredients that are potentially harmful to people and to the environment. Chemicals such as oven cleaners, paint removers, bug killers, solvents, and drain cleaners are just a few common hazardous products in the home. Over the last 20 years, concern about the disposal of such products has been growing. In 1976, the Resource Conservation and Recovery Act (RCRA) was passed, regulating the procedures governing the generation, storage, transport, treatment, and disposal of hazardous materials. Although this legislation has mitigated some of the problems associated with commercial hazardous material disposal, more efforts need to be made to reduce and properly dispose of hazardous waste in the home.



Hazardous products include the following:

- Cleaning products: oven cleaner, floor wax, furniture polish, drain cleaner, and spot remover
- Car care and maintenance: motor oil, battery acid, gasoline, car wax, engine cleaner, antifreeze, degreaser, radiator flush, and rust preventative
- Home improvement products: paints, preservatives, strippers, brush cleaners, and solvents
- Other products labeled toxic, flammable, or corrosive, or containing lye, phenols, petroleum distillates, or trichlorobenzene

Applicability

Municipal household hazardous waste programs are widely applicable and vary in scope. They can range from simply informing the public about the hazards of some commonly used household chemicals to establishing a household hazardous waste collection facility. More elaborate programs are best suited to larger communities that have existing facilities such as a municipal solid waste collection area. Municipalities with more limited resources can implement a small education campaign and expand the program as resources become available.

Implementation

First and foremost, communities should make their residents aware of the potential impacts of hazardous household materials on water quality and inform residents of ways to properly store, handle, and dispose of the chemicals. Oftentimes, bad habits that lead to water pollution stem from the fact that citizens don't know the chemicals are dangerous to the environment. Once they are informed, they can adjust their behavior to help protect water quality.

Municipalities can also inform residents about less-toxic alternatives to household hazardous wastes. The use of alternative products can be promoted through pamphlets, inserts in utility bills, or workshops. These nontoxic products can offer the same effectiveness as hazardous products with less impact on the environment. Elements of a good community household hazardous waste collection program include providing the public with information on how to dispose of hazardous items in their household, the hours and location of collection facilities, and items that are acceptable or unacceptable at the collection facility. This information can be provided through pamphlets, handbooks, posters, magnets, workshops, or other means. Local scout troops and other service organizations could also be recruited to help distribute door hangings or flyers as part of their projects.

Municipalities should try to partner with the solid waste disposal services in their communities for help with public education. If disposal services make it clear that they do not pick up hazardous materials, then residents will be alerted to the need for alternative disposal. These solid waste collection companies can also provide users with hazardous waste collection site information through their company's web site, newsletter, and billing statements.

In the spring of 1998, four Pennsylvania counties (Lehigh, Northampton, Monroe, and Schuylkill) partnered with two private waste-disposal companies, Safety-Kleen Services and Curbside, Inc., and two volunteer groups, Pennsylvania's Senior Environment Corps and the Environmental Alliance for Senior Involvement (EASI), to launch the first curbside pickup service for household hazardous waste on the East Coast. Known as the Door-to-Door Collection program, this new initiative will allow residents in the four counties to properly dispose of paints, paint thinners, solvents, motor oil, and other substances that should not be disposed of with household garbage. The partnership not only provides a curbside pickup program for household hazardous waste, but also educates citizens on how to prevent the accumulation of chemicals in the home environment. A key element of this service is convenience for area residents. Customers can make a phone call, put their waste in a container, and schedule a pickup.

Information on public outreach documents should include information about storing household hazardous wastes. For example, municipalities can recommend that when residents store paint, they should tightly seal the paint can and store it upside-down so that the paint will form a seal around the lid. Paint should also be kept in dry areas that will not freeze, and away from sparks or flames. Pesticides should be stored in a dry area in their original containers with the labels intact. They should be stored in a separate, locked cabinet or other secure structure, away from children and pets, food, medical supplies, cleaning products, heat, flames, or sparks.

Citizens should also be made aware of the proper use of hazardous materials, especially how much to use and how to avoid releasing materials into the environment. For example, many people who change their own automobile oil might think that draining and filling the oil is the only time that oil might be released. Approximately 420 million oil filters are sold annually, and at least 75 percent are disposed of in landfills. If these used oil filters were recycled, they could yield 17.8 million gallons of oil and 161,500 tons of steel. Furthermore, approximately 850 million gallons of collected used oil is reclaimed for use as a fuel supplement or lubricant (Arner, 1996).

To minimize the disposal of hazardous products, it is important that citizens know that it is best to use only those products that are absolutely necessary and to use nontoxic alternatives whenever possible. For example, it is possible to clean ovens by applying table salt to spills, then scrubbing with soda water. Also, approximately a cup of baking soda combined with a cup of white vinegar and 1 cup of ammonia in a gallon of warm water makes an excellent multipurpose cleaner. (See the alternative products fact sheet for more information about less toxic alternatives.)

Disposal of hazardous products used in the home also requires special attention. When use of hazardous household products is unavoidable, municipalities should emphasize to citizens that household hazardous wastes should not be flushed down the drain because these drains lead to either a home septic system or a municipal treatment plant, neither of which has adequate capability to remove hazardous chemicals from wastewater. Toxic chemicals might also disrupt microbial processes in septic tanks and treatment plants, reducing their effectiveness. Some of the toxins can be removed, but a significant portion of these chemicals passes through treatment processes and ultimately contaminates water resources. They should also be informed that hazardous products used in the home should never be poured on the ground, into gutters, or down storm drains where they will eventually enter storm sewers and be transported into nearby waterbodies untreated.

Some municipalities have started hazardous waste disposal and recycling centers. In fact, many communities have established hazardous waste collection days when hazardous products are collected from homes and taken to an approved facility for disposal. The municipality must make the effort to inform its citizens of the hours and locations of such sites and what materials are accepted there. The city of Austin, Texas, provides information about their household hazardous waste disposal program on the city's web site, located at www.ci.austin.tx.us/sws/hhw.htm (City of Austin, Texas, 2001). The site includes background information, the hours and location of the collection facility (with a map), materials accepted at the facility, details about disposing of business waste, hazardous waste recycling opportunities, and chemicals management.

Following is an advertisement for a household hazardous waste collection event created by the Shelby County, Tennessee government for its citizens (Shelby County, Tennessee, no date).

HOUSEHOLD HAZARDOUS WASTE COLLECTION EVENT

Here's your opportunity to dispose of Household Hazardous Waste FREE! Bring your adhesives, household batteries, herbicides, pesticides, oil/fuel additives, paints, and thinners!

When:

Saturday, May 19, 2001
8:30 - 2:30 p.m.

Where:

Shelby Show Place Arena
South Parking Lot
105 S. Germantown Road

Limitations:

100 lbs. per household
Open to residents of Memphis & Shelby County only!

Sponsors:

Shelby County Environmental Improvement Commission
Tennessee Department of Environment & Conservation

Co-sponsored by:

Memphis Light, Gas & Water
Memphis & Shelby County Health Department
Shelby County Roads & Bridges Department

For more information, call the Shelby County Environmental Improvement Commission at 387-5707.

The Shelby County web site (www.co.shelby.tn.us/county_gov/boards_commissions/SCEIC/waste_disposal/index.htm) also provides information to citizens on alternatives to toxic household chemicals and options for paint and solvent disposal.

Some communities establish partnerships with service stations to collect hazardous waste. This way, citizens from throughout the community can go to the location that is most convenient to them. The number of collection centers will depend on the size of the population and the resources available to the municipality. A general guideline is to have one collection center for 3,500 to 25,000 residents, two for 25,000 to 100,000 residents, and three for populations of more than 100,000 (Arner, 1996). Hazardous waste collection days should be highly publicized to ensure the message is received. Setting a schedule for collection days, such as the first Monday of every month, will help ensure that citizens know when they can drop off household hazardous wastes.

When materials are collected, they must be managed as hazardous wastes. Therefore, time and resources must be allocated to obtain the services of a registered hazardous waste management firm to safely remove and dispose of chemicals. In many cases, these firms can take over the operation of the collection event to maximize safety and ensure that no spills occur.

The Pennsylvania Department of Environmental Protection (DEP) published an excellent guidance manual for municipalities and other groups to start a household hazardous waste program. The manual includes information about budgeting and funding, restrictions, materials to collect and exclude, estimating collection amounts, suggested timelines, and operational tips. This manual can be downloaded from the Pennsylvania DEP site at www.dep.state.pa.us/dep/deputate/airwaste/wm/HHW/Documents/TechMan.htm.

Benefits

Properly disposing of household hazardous wastes ensures that contamination through leaks and spills does not occur. If such wastes are disposed of with regular garbage, the toxic materials could destroy landfill liners or other disposal areas.

Limitations

Municipalities might have limited resources to collect hazardous wastes and to advertise the program. Partnerships with private sanitary services and environmental or service groups can help. Municipalities must make an effort to establish these partnerships at the outset of the program so that the groups can take over a portion of the administrative planning and implementation.

Effectiveness

No matter what the scope of the household hazardous waste program, whether it is an educational campaign or a full-fledged collection program, citizens will have an increased awareness of the problems caused by mishandling and disposal of hazardous chemicals. Municipalities can gauge the effectiveness of their household hazardous waste program by surveying residents about their perceptions and behavior after education materials have been distributed. If a collection program is in place, effectiveness can be measured by the amount of materials collected at amnesty days or on a monthly or yearly basis at full-time collection facilities.

Cost

Costs for household hazardous waste programs can be high, especially if a collection program is selected. In some states, grants are available to assist municipalities with collecting household hazardous wastes. In Pennsylvania the Household Hazardous Waste Funding Act of 1994 reimburses municipalities for 50 percent of the developmental and operational costs associated with HHW collection programs, up to a total of \$100,000 per county per year (Pennsylvania DEP, 1999). Any municipality that registers a HHW collection program with DEP is eligible to apply for a grant. Grants are provided on a first-registered, first-conducted basis, prioritized according to criteria laid out in the Act. (Priority is given to existing programs and those operated by counties, multi-county groups, and first and second-class cities.) Additionally, the Small Business and Household Pollution Prevention Act provides 80 percent grants to counties to develop and implement pollution prevention education programs for households and small businesses, even if conducted in the absence of a collection program. Municipalities should check with their state environmental agencies to identify grant programs that can be used for household hazardous waste programs.

To allay the costs of hazardous waste disposal, recycling programs can be established to reuse some of the chemicals. Austin, Texas, offers a hazardous waste recycling program that allows residents to select from new or slightly used chemicals that were dropped off by other residents (City of Austin, Texas, 2001). Instead of incinerating these products at great expense, the facility will give them to anyone who wants them on a first-come, first-served basis. Products may include paint, solvents, automotive fluids, pesticides, fertilizers, cleaning products, or other chemicals. In its first four months of operation, the public reuse center saved \$3,207 through reduced disposal costs. There were 300 participants, and 14,562 pounds of hazardous waste were reused.

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Pet Waste Management

Public Education and Outreach on Storm Water Impacts

Description

When pet waste is not properly disposed of, it can wash into nearby waterbodies or can be carried by runoff into storm drains. Since storm drains do not connect to treatment facilities, but rather drain directly into lakes and streams, untreated animal feces can become a significant source of runoff pollution.

As pet waste decays in a waterbody, it uses up oxygen, sometimes releasing ammonia. Low oxygen levels and ammonia combined with warm temperatures can be detrimental to the health of fish and other aquatic life. Pet waste also contains nutrients that promote weed and algae growth (eutrophication). Eutrophic water becomes cloudy and green, making it unattractive or even prohibitive for swimming and recreation. Pet waste also carries bacteria, viruses, and parasites that can pose risks to human health and threaten wildlife.



Encourage pet owners to collect their animal's waste so it will not wash into sewers and streams

Applicability

Pet waste management is applicable to any municipality, since pet owners are a part of every community. Municipalities can do a variety of things to encourage pet owners to collect and properly dispose of their animal's waste. They can produce and distribute educational materials to residents to inform them about the effects of pet wastes on water quality and what they can do to reduce water pollution. Additionally, an ordinance can be enacted to provide a legal basis to enforce proper pet waste disposal with fines.

Implementation

The first step in a pet waste management program is to increase public awareness. Pet waste management programs strive to encourage proper waste disposal by passing local ordinances and launching public education campaigns to educate pet owners on the importance of cleaning up after their pets.

Many communities implement pet waste management programs by posting signs in parks or other pet frequented areas, sending mailings, and making public service announcements. Many communities have "pooper-scooper" laws that govern pet waste cleanup. Some of these laws specifically require anyone who takes an animal off his or her property to carry a bag, shovel, or pooper-scooper. Any waste left by the animal must be cleaned up immediately (Hill and Johnson, 1994). Some of these laws also include fines that can offset some of the program costs.

Sign posting is one of the most common outreach strategies for managing pet wastes. Signs can be used to designate areas where dog walking is prohibited entirely, where waste must be fully recovered, or where dogs can roam freely. Many communities post neighborhood signs asking pet owners to "Curb Your Dog." The rationale behind the request is that dogs walked along the curb are more likely to defecate on the roadside, where the waste can be captured by street sweeping. However, waste deposited in the road is also more likely to be washed down storm drains, so this tactic is not considered nearly as effective as a pooper-scooper ordinance. In addition to postings, many communities have established dog parks. Some communities have also installed "pet waste stations" with waste receptacles as well as a supply of disposal waste collection bags, scoops, and shovels.

In some communities, public works departments or public utilities have developed programs to control pet waste. More than 150 canines showed up at a Southern California pet store to put their paw print on a pledge to make sure their owners clean up their waste. The Los Angeles County Department of Public Works Environmental Programs Division developed a program to control pet waste. By profiling various groups of pet owners, the Division identified the best target for reducing coastal pollution. The program included a multimedia campaign to educate new and existing pet owners about the water quality impacts of pet waste. The program also distributed cleanup kits to owners and installed plastic bag dispensers in parks. The Division established partnerships with local pet stores and pet supply companies to promote the program (Lehner, 1999).

One important issue communities must decide on is whether to encourage residents to dispose of pet waste with regular trash, bury it in their yards, or flush it down the toilet. The city of Columbus, Ohio, recommends that pet owners flush it, or bag it and place it in the trash (utilities.ci.columbus.oh.us/sewers_drains/stormwater1.htm). In Lake Orono, Minnesota, pet owners are encouraged to flush waste down the toilet (taking special care not to flush yard debris or cat litter), bury it 5 inches deep in their yard and away from vegetable gardens and waterways, dispose of it in the trash, or to install an underground pet waste digester (similar to a small septic tank). More information about the Lake Orono program can be found at www.elknet.com/loia/pet.htm. San Diego County, California, prefers that pet waste be flushed down the drain. Alternatives to flushing include placing pet waste in the trash or burying it at least 3 feet in the ground. (See www.co.san-diego.ca.us/deh/stormwater/residential.html.)

Benefits

The benefits of pet waste management include a cleaner neighborhood in both site and smell and improved water quality through a reduction in nutrient inputs to waterbodies. It is also a message that is targeted specifically at pet owners.

Limitations

Because pet waste management is focused toward individual pet owners, the program is dependent on the participation and cooperation of all owners. Many pet owners consider it a nuisance to consider the environmental and aesthetic benefits of pet waste management.

Effectiveness

To be effective, pet waste management programs must be enforced. Neighborhood residents, community organizations, and even the municipality are responsible for ensuring that pet owners are picking up after their pets and properly disposing of the waste. For the program to be fully effective, every pet owner must participate. In the city of Oskosh, Wisconsin, dog owners are required to remove pet waste from any property other than the dog owner's. The penalty for failure to comply is \$116.75 in fines and court fees (City of Oshkosh, 2001). In Arlington County, Virginia, the county has established standards for dog exercise areas, including where to site them, how to maintain them, and what the financial obligations of the county are.

Costs

The cost of a pet waste management campaign will vary depending on several factors, including the materials produced (signs, ads, clean-up stations). The cost of signs will depend on the material used; plastics can be just as durable as and possibly cheaper than metal. In Sausalito, California, the Remington Dog Park was established in 1991. Since then, more than \$36,000 has been spent in park improvements. Most of the money has been raised by user donations (Dogpark.com, 2000). At the Mary Jane Roe Dog Park in the town of Clifton Park, New York, \$700 was spent to install a 500-gallon sealed underground septic tank for pet waste. Each pet owner is charged \$20 for a permit to use the dog park. Funds from the permit fees will be used to help offset the costs of the septic system (Kemper, 2000). In Poway, California, the city council raised \$25,000 to pay for fencing, gates, signs, irrigation, modifications, and retired fire hydrants (City of Poway, no date).

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Trash Management

Public Education, and Outreach on Storm Water Impacts

Description

Trash and floating debris in waterways have become significant pollutants, especially in areas where a large volume of trash is generated in a concentrated area. Trash in waterbodies contributes to visual pollution and detracts from the aesthetic qualities of the landscape. It also poses a threat to wildlife and human health (e.g., choking hazards to wildlife and bacteria to humans). Additionally, trash and debris can clog the intake valves on boat engines, which results in expensive repairs.



Trash collected from storm water using continuous deflection separation
(Source: City of Santa Monica, 2000)

Applicability

When developing control strategies for trash, municipalities should consider the following points:

- Implement a control structure designed to target the most prevalent types of trash and identify the source or sources of the trash.
- Evaluate the costs for each control. Develop a budget that takes into consideration what services and facilities are already available and can be utilized at the lowest cost.
- Regular cleaning and maintenance are necessary to prevent the accumulating trash at control structures from being hazardous itself.
- Control strategies should not just transport trash to another waterbody, but should reduce the quantity of trash in the water as a whole.

Implementation

Citizen awareness is key to a successful trash management program. Citizens should be informed about the environmental consequences of littering. Pictures are especially effective at describing the problem. To make the relationship between its young citizens and garbage collectors more personal, the public works department in Kenosha, Wisconsin, started a baseball card collection. Each card contains a full-color picture of a garbage collector, including his/her hobbies and interests, number of lifetime stops, and total pounds of garbage collected (Runoff Report, 1998).

There are two main methods of trash control: source control and structural control. There are four main techniques for source control: community education, improved infrastructure, waste reduction, and cleanup campaigns.

Community education, such as informing residents about their options for recycling and waste disposal, as well as the consequences of littering, can instill a sense of citizen responsibility. Flyers, door hangers, magnets, and bumper stickers are some of the ways to educate the public. These materials can be distributed through the mail, at public places (e.g., libraries, town halls), in schools, and at local businesses.

Improved infrastructure includes optimizing the location, number, and size of trash receptacles, recycling bins, and cigarette butt receptacles based on expected need. Communities that allow private trash disposal companies to serve the public should work with these companies to ensure that the community's trash management goals are reached.

Waste reduction includes encouraging the purchase of products with less disposable packaging as well as encouraging manufacturers to reduce the amount of packaging they use. Again, some methods of distilling this information include flyers, magnets, and using the community's web page.

Cleanup campaigns are an effective way to reduce trash. There have been many successful cleanup programs at beaches, along rivers, and in parks. By keeping track of what is being collected, the sources of the trash can be quantified and targeted for improved source reduction. Municipal projects such as street sweeping, receptacle servicing, and using cleanup crews along roadsides can also be effective in preventing trash from accumulating and entering waterways. Finally, specially designed boats are effective at removing floating trash and other debris from rivers, lakes, beachfronts, bays, and harbors.

The second method of trash control, structural control, includes physical filtering structures and centrifugal separation. Physical filtering structures, such as trash racks, mesh nets, bar screens, and trash booms, concentrate diffuse, floating debris and trash and prevent it from traveling downstream. Centrifugal separation targets trash in storm water during and after heavy precipitation events and involves physical separation of solids and floatables from water in combined sewer outflows by increasing the settling time of trash and particles.

In developing and implementing their trash management programs, municipalities need to consider short-term and long-term issues. One of the most important things to consider is where the trash will be deposited (e.g., landfill, incinerator). What are the capacity and life expectancy of that area? What will be used once capacity is met?

Benefits

The benefits of trash removal are vast. Better trash management increases the aesthetic quality of the landscape and decreases health and safety threats to both wildlife and humans. In addition, less litter from individuals can save the community money in terms of structural-runoff control maintenance. Effective recycling programs can reduce the quantity of waste being disposed of in landfills and allows for the reuse of raw materials.

Limitations

Without a well-rounded trash removal approach that includes both source and structural controls, noticeable reductions may not occur. It is important to implement several of the aforementioned techniques together to obtain a trash-free waterbody.

Effectiveness

It is important to clean and maintain the structural controls to keep them fully functional. In addition, ongoing source control efforts should be continuously implemented in order to achieve effective trash removal. Municipalities can measure the effectiveness of their trash management program by weighing the amount of trash cleaned out of structural runoff controls, collected at stream or roadside cleanup events, or collected from sidewalk trash bins.

Costs

The costs for source control vary depending on the type of method. For example, the cost of a community education program or a plan to increase the number of trash receptacles can be very minimal. On the other hand, a structural control strategy can be quite costly. Physical filtering structures, including trash racks, bar screens, and silt traps, can range from \$250,000 to \$900,000. Centrifugal separation for municipal storm water management systems can cost as much as \$3 million.

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Targeting public outreach/education

Education/Outreach for Commercial Activities

Public Education and Outreach on Storm Water Impacts

Description

The key to a successful outreach campaign is to target a message to a specific audience. The target audience is the group to whom a storm water pollution message is to be addressed. Industries and businesses can be a very influential component of the watershed. Many commercial activities contribute to storm water pollution (such as vehicle washing, landscape fertilization, and improper hazardous waste disposal). Therefore, it is important to address commercial activities specifically in an outreach strategy. It is also important to recognize that in most cases incentives must be provided to encourage businesses to change their behavior.



Signs can be posted to educate both employees and the public about the impacts of business activities on water quality

Applicability

There are numerous ways to provide education and outreach for commercial activities. Materials designed for businesses can include posters, magnets, calendars, flyers, brochures, and best management practices (BMPs) fact sheets or handbooks. For example, if the target audience includes restaurants and auto maintenance industries, you might consider developing and distributing educational brochures and posters to these industries that outline BMPs that reduce urban runoff volume and pollutant concentration that result from their operations. Several storm water programs also offer rewards to businesses that participate in a "storm water business" program and meet specific criteria. Such commercial storm water pollution prevention programs have been very successful across the nation.

Implementation

Depending on time, financial, and resource constraints, a municipality might wish to target all or several types of commercial activities. Some common practices are applicable to most industries and can be used on a variety of outreach materials. At all businesses, workers should "know their site," notice where runoff from their property goes, and know where their drain inlets go. Good housekeeping practices are required to keep pollutants out of storm drains and are also a good idea if a property drains to the sanitary sewer or combined sewer. The business should avoid toxic materials to the extent possible, store liquids where they cannot be knocked over, and consider the best place to conduct specific activities. For example, it might be better to clean a fleet of company vehicles at a commercial car wash rather than washing vehicles on the company's property because dirt, grease, and detergents can be treated effectively at car washes. To help keep rain from washing away pollutants, companies should be advised to keep dumpsters and other containers securely closed; store containers under cover; and cover stockpiled materials such as gravel, wood chips, and building materials (for example, by using plastic sheeting).

Businesses should be asked to clean up their sites, but not by washing grit and grime into the storm drainage system. Instead they should pick up litter, sweep areas and dispose of sweepings in the garbage (unless they are hazardous and require special disposal), and use absorbent materials to absorb oils.

Some commonly recommended BMPs for commercial activities include

- Good storage practices
- Waste management
- Vehicle and equipment washing
- Spill prevention and cleanup
- Property maintenance
- Training and education for employees and customers
- Eliminating improper discharges to storm drains
- Trucking and shipping/receiving
- Redesigning parking and landscaped areas to include storm water management features (i.e. rain gardens, bioretention areas, collection areas for roof runoff, and shared parking)

As an example, if the targeted areas are parking lots and parking garages, one might develop a slogan such as "Clean Lots and Clean Waters." Under this slogan, a colorful booklet could be produced. This booklet might describe proper parking lot cleaning procedures, such as the following:

- Promptly cleaning up vehicle leaks
- Using a rag or absorbent material to properly dispose of automotive fluids
- Regularly sweeping the parking lot and picking up litter
- Avoiding washing down the parking lot unless a mop for spot cleaning is used
- Disposing of the mop water to a sanitary sewer
- Rinsing the parking lot with water only (no soap) after first sweeping it up and cleaning up oil spots with an absorbent, or collecting the soapy rinse water and pumping it to the sanitary sewer

After the booklet has been developed, it can be distributed to local garages and parking lot authorities. The effectiveness of the outreach strategy should be evaluated using surveys or monitoring changes in water quality at the outlets of or downstream from targeted areas.

Automotive Service Centers and Garages. The solvents, oils, and paints used in automotive garages and service centers can become major storm water pollutants if handled improperly. Consequently, garages are typically targeted for storm water education campaigns. Outreach materials specifically tailored for the automotive repair industry can be created. The materials can describe how to develop the outreach message and select appropriate materials and provide information regarding distribution of a combination of materials such as posters, which can be hung in the garage, and flyers or brochures, which can be distributed to employees and kept in the shop's office or lobby. Titles should be eye-catching and meaningful to the audience, such as "Keep Your Shop in Tune . . . and Protect the Bay!" or "Is Water Quality Going Down the Drain in Your Garage?"

The following are recommended topics with practices to control waste from auto shop activities:

- Changing automotive fluids (brake fluid, transmission fluid, gear oil, radiator fluids, and air conditioner Freon or refrigerant).
- Working on engines, transmissions, and miscellaneous repairs.
- Preventing leaks and spills.
- Cleaning up spills.
- Identifying and controlling wastewater and discharges.
- Fueling vehicles.
- Removing and storing batteries.
- Cleaning parts.
- Metal grinding and finishing.
- Storing and disposing of waste.
- Selecting and controlling inventory.
- Outdoor parking and auto maintenance.
- Vehicle washing, engine cleaning, and automotive steam cleaning.
- Training and educating employees and customers.
- Pretreating water discharged to the sanitary sewer.
- Installing a roof over fueling areas or outdoor working areas (to keep storm water off these surfaces).
- Regrading or repaving outdoor areas.
- Recycling spent fluids on-site.

Home mechanics. In addition to targeting automotive service facilities, many storm water programs also provide outreach materials for automotive "do-it-yourselfers." Pamphlets, brochures, and flyers can be used to outline how to properly dispose of used motor oil and other automotive fluids. Contact information for local commercial recyclers of automotive fluids should be included. To target home mechanics specifically, materials can be placed in automotive supply outlets or mailed to members of a mechanics club or subscribers to home mechanic periodicals.

Municipalities should provide incentives for businesses to participate in pollution prevention activities. Participants can be rewarded with technical assistance, promotional items, and public recognition. In Austin, Texas, "Clean Water Partners" receive banners, T-shirts, and mention in newspapers and newsletters. King County, Washington's "EnviroStars" are promoted through the Green Business Directory, a directory of environmentally friendly businesses distributed to the public.

A municipality can choose to establish a better business program, which provides assistance, incentives, and recognition for businesses that use practices to effectively reduce storm water pollution. Some programs target all businesses in the community, whereas others focus on a specific industry, such as automotive shops, power washers, and carpet cleaners. Palo Alto's Clean Bay Business Program offers recognition and promotional advantages to vehicle service facilities that implement certain BMPs (NRDC, 1999).

In Portland, Oregon, the metropolitan Portland public agencies, known as the Pollution Prevention Outreach (P2O) Team created the Eco-Logical Business Program to advise automotive shops on ways to manage wastes and reduce environmental impacts. To date, five automotive service operations have volunteered for this new program and subsequently met certification criteria. These criteria recognize shops that use management practices designed to limit waste creation and prevent releases to the environment through spills or improper disposal. In most cases, these practices go beyond the minimum to comply with environmental regulations. Some automotive shop pollution prevention and environmental protection practices include recycling or reusing automotive fluids and solvents, using less-toxic cleaners and degreasers, and using secondary containment structures to prevent spills. The program provides an incentive for conscientious businesses to go beyond basic compliance expectations and take extra steps to protect the environment. This sets a new standard for the industry and leads to improved environmental protection. The participating auto shops each received a certificate and window sticker during a news conference. Program coordinators hope that recognition as an environmentally friendly business will be a useful marketing tool for the shops, while attracting other businesses to join the program as well.

Benefits

One of the benefits of outreach programs for businesses, as with all outreach programs, is an increase in public awareness about water quality issues. Additionally, because many business practices use materials and chemicals that are harmful to the environment, it is important for municipalities to inform owners, operators, and employees about which practices should be avoided to maintain and improve water quality. Also, businesses that are more aware of environmental issues might be willing to partner with municipalities and sponsor programs and activities that reach a wider audience in the community. The businesses receive advertising in return for donations of materials, personnel, or use of their facilities.

Limitations

Commercial outreach programs do have some limitations. There are many different types of commercial activities, and outreach programs might not be applicable to some of them. Before developing and implementing an outreach program, municipalities should prioritize business types that they think might contribute most to storm water pollution or that might be most receptive to outreach. Because the measures that the municipality proposes for businesses are voluntary, owners, operators, and employees must be convinced that changing their behavior is valuable and worth their efforts.

Effectiveness

Municipalities can gauge the effectiveness of their outreach program for commercial activities through surveys of employees. The survey can determine if outreach materials and programs have changed business policies or employee behavior. Also, if a municipality has an incentive program that encourages businesses to register to be listed as a better business, the registration process can be used to gather information about which pollution prevention practices are being used at each business. Additionally, the number of registrants can be used to gauge the effectiveness of the advertising campaign for the program.

Cost

The costs associated with developing an outreach campaign for commercial activities depend on the types and quantities of materials produced, the resources needed (for distribution, contacting businesses in person, etc.), and the general scope of the campaign. Photocopying or printing prices can vary widely, depending on the complexity of the brochure, pamphlet, or poster. Municipalities should consider financial constraints when developing outreach materials. Implementing a "Better Business" program will require dedicated labor, database management, and educational information.

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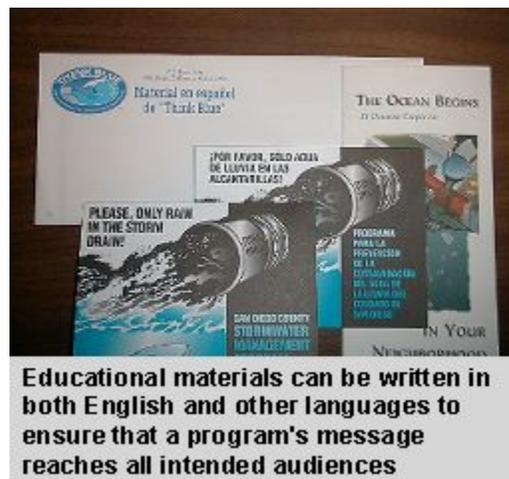
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Tailoring Outreach Programs to Minority and Disadvantaged Communities and Children

Public Education and Outreach on Storm Water Impacts

Description

Many communities are ethnically and culturally diverse, and a portion of the population speaks languages other than English. The messages contained in signs, brochures, advertisements, newsletters, and other outreach materials that are printed only in English are mostly lost on these groups. For example, in areas such as southern Florida and southern California, where a large proportion of the population consists of Spanish-speaking immigrants, it is important to reach out to non-English speaking residents and inform them about storm water pollution issues and the importance of clean water, because their activities can generate a substantial amount of pollution. This type of expanded outreach program is not limited to these areas. Census 2000 figures show increasing minority populations in urban centers and suburbs such as Washington, DC (Fernandez, 2001; Cohn and Witt, 2001), and New York (Cohn, 2001), among others.



Other groups that communities can target for outreach activities are disadvantaged persons who may not have the opportunity to learn about or participate in existing programs and activities. Municipal officials and representatives can design and implement special education programs in poorer neighborhoods to listen to and address the concerns of these residents and to offer suggestions about ways that these residents can improve their neighborhood and environment.

Applicability

Municipalities are typically aware of the locations of ethnic enclaves and low-income areas. However, historic distinctions between neighborhoods may not be accurate and are most likely changing. It is important for municipalities to survey residents about neighborhood demographics and determine if a specialized campaign is needed in a particular area. The survey can target areas that the municipality deems most likely to contain minority and disadvantaged residents. Municipalities can seek assistance from sociology departments at local universities to help with the survey effort or can hire a firm specializing in focus groups and polling to conduct the research.

Once minority and disadvantaged groups have been identified, an analysis of the target group should be conducted. This analysis should determine the audience's perception of storm water issues so the municipality can tailor the outreach program to the appropriate knowledge base and address specific issues of concern. This tailoring will increase the likelihood that the groups are motivated and willing to participate in the program. For example, does the audience know what a watershed is or understand what causes polluted runoff? If not, those terms should be defined in the messages.

It is also useful for the municipality to find out how the target audience receives its information, in order to more effectively develop, format, and distribute environmental messages. Which newspapers, magazines, or newsletters do they read? To what organizations do they belong? Do they watch local news or cable television? Do they receive information in other forms such as community radio programs? Who are the opinion leaders, and how can they be reached?

Implementation

After gathering information on the target audience, a message should be crafted that will engage them and help achieve the objectives of the program. To be effective, messages should be understood by the target audience and appeal to them on their own terms.

Tailoring Programs for Minorities. Storm water objectives are more likely to be attained if the largest audience possible is reached. However, to ensure that the message is understood, smaller target audiences might need to be identified. These smaller groups represent specific ages, demographics, and nationalities. If the target audience has a large proportion of minority groups, the outreach strategy should address each of these groups. Representatives from minority groups can help to develop the outreach strategy. They can provide critical insight to help ensure that the message comes across as it is intended.

In bilingual areas, materials should be developed in both English and the local language. Furthermore, care should be taken to ensure that the translation is accurate and the meaning of the message is not lost or changed. A classic example of a marketing mishap is when General Motors introduced its Chevy Nova into Latin America; in Spanish "no va" translates into "it won't go," making the car very unattractive to buyers. Pepsi's "Come alive with the Pepsi generation" translated into Chinese came across as "Pepsi brings your ancestors back from the grave." The "language" of the message should not only be correct but also understandable. Scientific jargon should be avoided and terms associated with the initiative (e.g., storm water, nonpoint source pollution, and runoff) should be defined. Graphics should be used to convey the message, rather than text. If text must be used it should be kept brief, direct, and clear. If the reading level of the audience (especially children) is unknown, the message can be pretested with representatives of the target group to determine its level of appropriateness.

Partnering with minority organizations can be the best way to reach a minority audience effectively. Temples, churches, minority civic organizations, and the like are in touch with minority communities and understand their perspectives and motivations. Not only can they provide general information about the target group, but they can also serve as an excellent medium through which to channel the message. Organization leaders can be contacted to inform them about the objectives of the program and why it is important to their members. Organizations can announce upcoming events at meetings or services, publish releases in newsletters and notices, and organize presentations. It is important to stress how storm water pollution prevention affects *them* in particular.

The news media are an important and powerful means of communicating watershed messages to both targeted and broad audiences. When a campaign is initiated, minority-focused newspapers, magazines, and television and radio stations in the area should be contacted. The proper format--whether in English, another language, or both--should be provided. Public service announcements and headlines should be culturally appropriate.

Tailoring Programs for Disadvantaged Communities. The same principles for targeting specific audiences apply to disadvantaged communities. When creating a storm water pollution message, the message should be specific and tied to what the community values (such as clean drinking water or clean waters for fishing and recreation). The audience should know what their *direct benefit* will be from getting involved in the issue or modifying their behavior. For example, not letting the hose run water into the street when not in use can save them money on their water bill. Messages should be positive because positive messages tend to be more effective in changing people's habits than negative ones: "Collect your used motor oil" instead of "Don't dump your oil." Other benefits that could be listed include money savings, time savings, convenience, health improvements, and efficiency. The message should focus on making everything--the behavior change requested, the involvement needed, and the support required--user-friendly.

Tailoring Programs for Children. There are many ways to target children with an outreach program. Perhaps the easiest way is through schools and day care centers. Child-targeted printed materials (posters, flyers, stickers, etc.) can be displayed in schools, libraries, and at playgrounds. Teachers might be willing to distribute storm water curriculum packets and to organize special events, such as a storm water pollution day or awareness month. Many watershed outreach programs hold water festivals that include everything from games and interactive booths to river/beach cleanups and essay contests. Many storm water pollution programs have partnered with schools to hold poster, logo, and slogan contests and have used the winners for their outreach materials. Participants can receive awards, such as certificates of participation, T-shirts, posters, and stickers.

When creating outreach materials for children, the messages should be simple and understandable. Graphics such as photos and mascots can help. Mascots become familiar faces that can take on personalities, stories, and "lives" of their own. Child-friendly people or animals can be adapted into puppets, comics, posters, banners, displays, festivals, parades, calendars, contests, skits, student lessons, or activities. Materials that are interactive, such as workbooks, "laboratory" experiments, puzzles, and games are effective because children learn best by "doing" rather than "being told." Many storm water program web sites have added an interactive "kids' page" where children can learn about storm water pollution by solving puzzles, playing games, and performing experiments on the Internet.

Getting children's organizations involved in specific, hands-on projects can be effective. Approach children's groups to help with stream cleanups, wetland plantings, and volunteer monitoring. Most storm water programs partner with youth groups during storm drain stenciling projects. Such activities can be incorporated into the group's curriculum. For example, by participating in a storm drain stenciling project, Girl Scouts and Boy Scouts can earn environmental badges.

Community Calendar Gets the Message Out. In an effort to reach every residence in the target area, including lower income and minority households, the Environmental Health Coalition (EHC) of San Diego's Chollas Creek Watershed mailed its 1992 calendar to every business and home in the target watershed area. The calendar was in full color and fully bilingual (English and Spanish). The winning posters from a school poster art contest provided the art for each month. The calendar contained specific information on the different types of nonpoint source pollution and offered tips on how residents could reduce their contribution to water pollution in San Diego Bay. Because a large portion of its target audience was ethnically diverse, the EHC expanded its calendar to include dates of interest to these communities. Dates such as Kwanzaa, Boun Soang Heua, and the Chicano Moratorium were noted, in addition to more commonly recognized holidays. The EHC also included dates of activities from neighborhood churches, activity centers, and other community groups. The center of the calendar featured a pull-out of a watershed painting by a renowned local artist. The calendar was printed on recycled paper using soy-based inks.

The Chollas Creek Watershed Protection Calendar was extraordinarily successful. Similar calendars have already been produced in two other states and Mexico. The calendar was expensive to produce, in terms of money and time, but it provided education on water pollution prevention over an entire year and represented a gift from the EHC (through their Chollas Creek Project) to the community.

Effectiveness

Targeting specific groups can be effective when cultural, language, and special needs of such groups are understood. Municipalities can gauge the effectiveness of the targeted outreach programs by monitoring participation in watershed cleanups and other environmental activities, surveying residents about changes in their behavior resulting from outreach efforts, or monitoring water quality and general environmental conditions (evidence of nonpoint source pollution such as trash or motor oil spills) in or downstream from ethnic enclaves or low-income areas.

Benefits

There are many benefits to targeting specific audiences, especially if they constitute a large proportion of the population. If the outreach program is tailored to a specific audience, the participants are more likely to feel that they are an important part of the effort. They can learn more specifically about the ways they might cause storm water pollution and how it affects their neighborhood environment and quality of life. They also learn what they can do to help curb storm water pollution, improve conditions in their neighborhood, and be aware of and prevent environmental injustices.

Limitations

Municipalities should understand cultural issues, language barriers, and specific needs in order to respond to questions with sensitivity and engage participants in environmental efforts. Research about community demographics is key to identifying where target audiences reside and how they receive information. The more knowledge the municipality has about the target audiences, the better they can use limited resources to effectively send their message.

Cost

The cost of targeting specific groups depends on the particular outreach materials and programs that are developed for these groups. Public service announcements and other news releases are generally free of charge, but staff time for preparation can be substantial. Costs for outreach materials vary widely, but municipalities can choose a medium appropriate to the available resources.

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Classroom Education on Storm Water

Public Education and Outreach on Storm Water Impacts

Description

Classroom education is an integral part of any storm water pollution outreach program. Providing storm water education through schools exposes the message not only to students but to their parents as well. Many municipal storm water programs have partnered with educators and experts to develop storm water-related curricula for the classroom. Fortunately, these lessons need not be elaborate or expensive to be effective.



Students learn about storm water pollution (Source: City of Sacramento Storm Water Management Program, no date)

Applicability

It is important to emphasize that the role of a municipality is to support a school district's effort to educate students about storm water, not to dictate what programs and materials the school should use. Municipalities should work with school officials to identify their needs. For example, if the schools request storm water outreach materials, municipalities can provide educational aids that range from simple photocopied handouts, overheads, posters, and slide shows to more costly and elaborate endeavors such as working models and displays. The Daly City (California) Utilities gave a slide show and video presentation depicting the problem of marine entanglement to an eighth-grade classroom just before their 1998 beach cleanup. Afterward they had their largest volunteer turnout ever for a cleanup.

Implementation

Building a strong relationship with the school district is the most important step in getting storm water education into the schools. One of the first questions to ask is what storm water education program, if any, do the schools already implement, or want to see in their schools but lack the resources to do so. When developing an outreach message for children, choose the age ranges to target. Will the focus be on students in preschool, grammar school, middle school, and/or high school? Should the curricula be grade-level specific? Will the program involve a year-long study, a semester, a special topic or event, or a single presentation by an organization? What special equipment might be needed? For example, the municipality might purchase a small-scale watershed model that can be loaned to schools for demonstrations as part of a watershed education program. The answers to these questions and others will be determined by both the school district's needs and the municipal resources available.

If the school district requests that education materials and programs be developed by the municipality, municipal officials can get ideas for these materials from several resources. Many national and regional organizations can provide assistance and materials for storm water education. The national Center for Environmental Education (CEE) was established in 1990 to provide teachers with a single clearinghouse for K–12 environmental education materials (CEE, no date). CEE has written a guidebook titled *Blueprint for a Green School* to tackle the environmental challenges found inside schools and on school playgrounds. CEE's outreach department works with schools nationwide. One of the most popular programs, *Green School's Peer Partners in Environmental Education*, organizes high school students to adopt an elementary school or class. A free copy of the on-line program is available through Earth Spirit at 310-582-8228. CEE's Internet page at www.cee-ane.org is another good source of information.

Many additional classroom materials are available for use free of cost. Communities such as Colorado Springs, Colorado, have made copies of their educational materials available for downloading from the Internet at www.csu.org/water/watereducation/watereducation.html. The Colorado Springs educational series includes water-related artwork, creative writing, research conducted by students, Internet programs and games, a virtual tour of the Colorado Springs water system, and the "Keepers of the Water" classroom lesson series. Developed by local teachers, water experts, and education specialists, the study-based units explore the characteristics of the local water environment as it affects the harvesting, treatment, and delivery of drinking water and the collection, treatment, and return of wastewater. The interdisciplinary nature of these activities enables teachers to work in teams and help students explore a range of water issues (Colorado Springs Utilities, 1996).

The city of Eugene's (Oregon) Storm Water Management Program offers a free 13-page booklet listing storm water videos, classroom presentations, demonstrations, and models available for checkout to Eugene teachers. Guest speakers also are available to give classroom presentations.

The city of Los Angeles's Storm Water Program offers several classroom materials, including a *Special Agent Task Book* to supplement its EcoTours program targeting third and fourth graders, the *Clean Water Patrol* coloring book (which teaches children about their urban forest and how neighborhood behavior can affect the environment), and colorful vinyl stickers with clever storm water sayings, such as "You Otter Not Pollute."

The University of Wisconsin offers educational materials titled "Educating Young People About Water." These materials can help the user develop a community-based, youth education program that targets youths, links key members of the community, and allows both groups to work together toward common water education goals. Various guides and other educational materials are available from the university. More information about these materials and ordering information can be found at www.uwex.edu/erc/ywc/index.html.

Other programs have created models or displays to be featured in several schools. Sacramento, California's Storm Water Management Program has designed a working storm water model display that demonstrates the many sources of storm water pollution. The exhibit features a model of a typical section of an urban community showing storm water and pollution draining into a creek. Real water flowing in the creek and periodic rainstorms on the model draw attention from both children and adults. Interactive buttons highlight different sources of storm water pollution occurring within the community. Brief explanations of storm water pollution accompany the model display and help to convey the important message that storm water flows directly, untreated, into area creeks and rivers. The model is available on a limited basis for loan to schools and other educational programs in the Sacramento area (City of Sacramento, 1999).

San Diego's Environmental Health Coalition (EHC) has developed two excellent environmental curricula for the San Diego Regional Household Hazardous Materials Program (SDRHHMP). *Pollution Solutions Start at Home* is an interdisciplinary curriculum for middle and junior high schools. *Household Toxics* is a curriculum for fourth-through sixth-grade students about the safe use and disposal of household hazardous materials and safer alternatives to such products. EHC also produces a Watershed Protection Kit, which includes two learning activity packets, 10 storm drain stencils, and a carrying case (\$50.00). These materials and others are available through the Environmental Health Coalition, 1717 Kettner, Suite 100, San Diego, CA 92101, 619-235-0281.

Seattle Public Utilities has recently turned its award-winning "Water You Doing" video into an educational CD-ROM for classrooms and libraries. The CD features the video, games, activities, and career profiles highlighting Seattle's and Puget Sound's water resources. The CD is available for use at the Environmental Information Center in the main Seattle Public Library and all 22 branches. It is being distributed to teachers within Seattle Public Utilities' service area at no cost. Outside Seattle, discs are available for a nominal fee to cover the cost of pressing and shipping. Copies can be obtained from Seattle Public Utilities by contacting Richard Gustav at Seattle Public Utilities, 710 Second Ave., 10th floor, Seattle, WA 98104, 206-684-7591.

Home*A*Syst is a program designed to aid homeowners and renters in understanding environmental risks in and around their home. The program guides the public in developing action plans for making voluntary changes to prevent pollution. Additionally, Home*A*Syst helps individuals understand what they can do to help protect the environment, how they should take action, and where they can find the support necessary to act. To accomplish this, the program offers a guide entitled *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home*, which provides in-depth information and comprehensive checklists to help users evaluate environmental risks. The guide is composed of eleven chapters that cover a variety of topics, including storm water. If children are made aware of this resource, they can encourage their parents to use the program and reduce environmental risks around the home. More information about Home*A*Syst can be found at www.uwex.edu/homeasyst.

The U.S. Geological Survey (USGS) offers a number of educational resources. Posters are available for teaching students in grades K–12, about wastewater, water quality, groundwater, and water use. The USGS also offers fact sheets, useful links, and an educational outreach program designed to stimulate interest in fresh water resources for students and educators in grades K–12. This information can be found at water.usgs.gov/education.html. Similar to USGS, EPA offers a number of educational resources for students and teachers, which are located specifically in their environmental education and student "centers." More information about these centers, as well as specific resources found within each, can be obtained at www.epa.gov/epahome/students.htm.

The *Green Teacher* is another educational resource that is useful for educating students. The magazine, which is written by educators, is designed to help educators enhance environmental and global education across the curriculum for all grade levels. Each issue contains articles, ready-to-use activities, resource listings and reviews, and a number of other resources. More information about the magazine can be found at www.web.ca/~greentea. Other educational resources for K–12 educators are available from the Water Environment Federation (www.wef.org/WefStudents/index.htm), the Wisconsin Department of Natural Resources (www.dnr.state.wi.us/org/caer/ce/bureau/education/education.htm), Project WET (www.montana.edu/wwwwet), and a number of other organizations and programs throughout the country.

American Oceans Campaign offers storm water runoff education resources in many different formats, including ads, videos, brochures, fact sheets, curricula, and newsletters. American Oceans Campaign started collecting these resources in 1999 from government and nongovernmental organizations and private agencies. These resources can be found at www.american oceans.org/runoff/epa.htm.

The Colorado Water Protection Project has created the "Colorado Water Protection Kit" which is a useful booklet of storm water information. This kit contains information on polluted runoff, landscaping, yard and garden products, pet waste, household hazardous waste, motor oil and automotive products, boating and marinas, conservation, and septic systems. The Protection Kit can be found at www.ourwater.org.

Effectiveness

The effectiveness of storm water education in the classroom depends on many factors. The lessons and activities must be interesting and fun, and most importantly, they must be targeted to the correct age group(s).

Benefits

The benefits of teaching schoolchildren about storm water issues are plentiful. These children will learn about environmental issues early and will therefore become interested and perhaps involved at earlier ages. Schoolchildren often tell their parents what they learn in school. Therefore, teaching children about storm water is an effective way to pass environmental awareness to their parents and throughout the entire community.

Limitations

One of the limitations of classroom education is being able to incorporate storm water issues into the school curricula. With so many subjects to teach, environmental issues might be viewed as less important. Another limitation is the cost of new materials.

Cost

Many classroom education materials are available free of charge by order or download from the Internet. Storm water agencies can generally supply information and materials. The cost of producing materials will vary with the scope of efforts. For example, producing classroom packets can cost as little as \$100–\$200, whereas the cost of permanent displays and models can be as high as \$1,000–\$5,000 or more. Make sure to get estimates from individual vendors before preparing the classroom educational materials budget. Work within attainable financial means. If applicable, contact corporations to sponsor the programs or to donate materials.

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Storm Water Educational Materials

Public Education and Outreach on Storm Water Impacts

Description

Storm water education starts with a well-thought-out and well-developed outreach plan. The outreach plan should identify goals and objectives, classify the target audience, identify the message to be conveyed, and explain how the message will be distributed to the audience.

Applicability

The first step for a municipality will be to determine who the target audience is or whether there is more than one audience to target (see Attitude Survey fact sheet). If there is more than one audience to address, can they be reached simultaneously or should they be prioritized? This will depend on the type(s) of audiences to be reached and the message(s). Once the target audience(s) has/have been determined and the storm water message has been packaged, distribution can begin. Outreach materials (posters, flyers, magnets, etc.) will not help prevent storm water pollution if the target audience does not receive and read them. Common distribution mechanisms include direct mail, door-to-door distribution, telephone, targeted businesses, presentations, handouts at events, media outlets, and messages posted in public places. Deciding how to distribute materials involves a close look at the level of time, resources, and work required. For example, if posters with a storm water message are to be printed, several things need to be decided: Should the posters be mailed to a specific audience? Should mailing tubes be purchased? Are addresses available?



Some examples of storm water educational materials

Implementation

Outreach and education can be implemented in several ways. It is not always necessary that the entire audience be reached at once. Therefore, one or more of the following approaches might be useful.

Mail. The mail delivery system can be the best distribution vehicle if the target audience can be defined geographically or if a mailing list that encompasses the entire audience (e.g., landscapers, farmers, garages) is accessible. The U.S. Postal Service has established procedures for bulk mailings, and it is advisable to contact the post office early to discuss the pros and cons of this delivery approach. In addition, lightweight flyers and brochures can be added to general mailings, such as utility bills or notices about municipal services, without raising the cost of postage.

Door-to-Door. Door-to-door canvassing is very effective, but it is resource-intensive if employees are required to deliver the items. If it is too difficult or expensive to send employees door-to-door, it might be possible to work with local scout troops, environmental groups, or other organizations who are willing to canvass or deliver the message. A recommended approach is to print door hangers with the message that can be distributed without disturbing the occupants.

Businesses, Organizations, and Public Places. Using selected businesses and organizations to deliver the message can increase the likelihood of reaching the target audience and save money on postage. For example, if a brochure or poster on oil recycling is printed, the brochure/poster could be displayed at auto parts supply outlets. Lawn and garden centers could display an alternative lawn care poster. Businesses will be more likely to distribute materials if there is an added benefit to them. "Green company" endorsements could be included on the posters. Septic tank pumpers could be asked to distribute refrigerator magnets containing information on proper septic tank care and include a space on the magnet for the customer to write down the pumper's name and phone number. Schools and local organizations with building space are good candidates for the display of materials, especially posters.

Presentations. Presenting the message directly can be a very effective way to reach the target audience. The audience should be allowed the opportunity to ask questions, and any questions should be responded to immediately. Presentations can be given at events tailored to the audience, such as schools, retirement homes, local clubs, libraries, businesses, and associations.

Conferences. Conferences can be an excellent way to distribute messages through presentations, promotional give-aways, and displays. However, a conference might not reach all of the intended audience, and those who attend might already be familiar with the message and its significance.

Media. Messages that are recorded either in audio or video can be played on local radio or cable stations, particularly if they are required to make public services announcements. Sometimes the easiest way to distribute a message is to have someone else do it. If the target audience subscribes to an existing periodical, it might be more effective to include the message in that publication. It will certainly save time, instead of dealing with mailing lists, postage costs, or news media releases. It also increases the likelihood that the message will actually be read by members of the target audience since they are already familiar with the publication. Brochures and flyers can also be displayed in local libraries and other public buildings.

Effectiveness

The effectiveness of distributing storm water materials depends on many factors. These include the costs associated with designing, producing, and distributing materials. Other factors are the type of audience to receive the message and what the audience does with the materials. The quality of the materials also plays a role in the message's effectiveness. It is important that a brochure be carefully prepared to ensure that it is actually read. Another approach is to convey a message in a simple form, such as a magnet. A magnet posted on a refrigerator at home is likely to be more effective than a flyer that is wordy or complicated.

Benefits

Benefits to using storm water outreach material are that they can reach a large audience. If the slogans, graphics, and other aspects of the materials are catchy, the messages will be even more effective.

Limitations

Limitations to outreach materials are mainly associated with the time and cost of making and distributing the materials. Other barriers are the types of audiences to reach; for example, various age groups might need to be addressed separately.

Cost

The cost of distributing storm water messages depends on the method used and what is to be distributed. The U.S. Postal Service bulk mail has specific requirements, but discounted unit costs. Going door-to-door can be labor-intensive and requires staff or volunteers and transportation. Using businesses to distribute the message can be very effective and requires virtually no distribution cost. Electronic presentations (e.g., in Microsoft PowerPoint) can be a less expensive way to present information if computers and projectors are available for use or loan. Presentations can be costly, depending on the materials. Flip charts and posters can cost \$5.00 each or more. Producing 35-mm slides (from slide film or computer disc) costs approximately \$4.00 per slide.

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Public outreach programs for new development

Low-Impact Development

Public Education and Outreach on Storm Water Impacts

Description

Using low-impact development (LID) approaches for new development can help to achieve storm water pollution reduction goals. Through LID approaches, storm water runoff can be controlled while development objectives are achieved.

An important component of a municipal LID program is public outreach. The first step in achieving LID is to encourage developers to adopt such approaches. This is followed by the development and implementation of a program to ensure that design standards are met and that homeowners are adequately informed of their responsibilities. The latter should be the responsibility of the developer and homebuilder.

This outreach takes the form of the developer's communicating maintenance instructions and pollution prevention measures to the property owners. The public outreach program informs property owners of their responsibilities to the environment. When successfully implemented, LID education and awareness programs accomplish the following:

- Establish a marketing tool that allows developers to attract environmentally conscious buyers
- Create more landscaped areas, enhancing the aesthetics of developed areas
- Educate property owners on effective pollution prevention measures
- Promote the proper maintenance of best management practices
- Inform commercial property owners of potential cost savings from using LID approaches

Applicability

Outreach for Residential Properties. LID public outreach programs accomplish the above goals by providing residential property owners with essential information to maintain a property in an environmentally friendly manner. For example, one of the critical aspects of these programs is teaching property owners to maintain previously installed pollution prevention and best management practices properly. The developer or local public agency should communicate to current or potential property owners the benefits of LID, as well as their individual maintenance responsibilities as property owners. For example, property owners should understand that effective management of an LID property includes maintaining vegetative buffers, removing trash and debris from outflow points, using fertilizers properly, sweeping paved areas, practicing water conservation, and using mowing practices that promote runoff infiltration.



Directing runoff from impervious surfaces, such as parking lots, onto vegetated areas using curb cuts can achieve pollutant removal and reduce runoff quantity through infiltration

Outreach for Commercial Properties. Municipalities should consider three objectives when developing an outreach program for commercial properties. First, they should educate developers and provide incentives to incorporate LID practices into their designs. Second, they should educate existing commercial property owners and provide incentives to retrofit their properties with LID practices, especially for areas adjacent to sensitive waterbodies. Finally, municipalities should provide guidance and other assistance to property owners who have already incorporated LID practices into their landscapes.

Implementation

Development of public outreach programs for LID properties should be tailored to a specific site and audience. The first step in developing a public outreach program is to identify the objectives of the program. For example, is the goal of the program to educate potential property owners about the maintenance requirements of best management practices, or simply to inform commercial property owners of the potential cost savings of LID? These goals should be considered when selecting outreach materials for distribution.

The next step in the development of an outreach program is to identify the target audience. For residential, commercial, or industrial LID properties, the developer might need to communicate with diverse audiences, including potential buyers, new property owners, builders, construction site managers, homeowner associations, and current property owners. The message to each respective audience differs slightly. For example, developers often promote the environmental benefits of LID to potential buyers by emphasizing measures such as reforestation or landscaping practices conducted at a site. Potential buyers must also be informed of their responsibility to maintain measures that have already been implemented. When dealing with builders and site construction managers, the developer must inform all parties of appropriate phasing and construction practices necessary to properly implement management practices. Developers must also provide new property owners with a set of conditions to be met with the acquisition of the land. After the property is transferred to a new owner, the developer should assign someone to train the new property owners and monitor maintenance activities.

When the goals and the specific audiences are identified, the development and transfer of information to the property owner can be achieved in several phases.

Program Planning. In the program planning phase, the developer meets with county or state review agencies to determine which best management practices are applicable and to identify the maintenance requirements of a specific property. The developer should obtain and understand documentation of the construction and maintenance requirements of the best management practices and then pass this information on to the property owner. The product of the program planning phase is a set of informational materials that provide the property owner with general information on LID as well as specific property maintenance information.

Buyer Awareness. In the buyer awareness phase, the developer must make the potential property owner aware of the benefits and the responsibilities of owning a LID property. The developer should inform the potential buyer of the aesthetic and financial value of the management practices that have been implemented on the property. In addition, it should be emphasized that the responsibility of maintaining best management practices on the property falls on the potential property owner. In this phase, the potential owner should be provided with maintenance materials that outline the basic requirements for the best management practices (BMPs) located on the property.

Settlement Documents. The sale of LID sites typically involves legal information and instruments to ensure that the property will be properly maintained. These legal approaches may include easements, covenants, homeowners' association requirements, or other instruments. The maintenance requirements for these documents can be developed from brochures, fact sheets, and sample documents from the county. The requirements and wording often must be approved by a review agency. When these documents have been compiled, the developer must allow the buyer to evaluate and then accept the terms associated with acquisition of the land.

Inspection. During the construction phase, county inspectors should be on-site to ensure that BMPs and proper construction practices are followed. To avoid construction problems, the developer should communicate with the builder and site construction manager to make them aware of appropriate phasing and construction practices.

Maintenance. The maintenance of the BMPs is ultimately the responsibility of the new property owner. After the initial property transfer, however, the developer should assign someone to ensure that the maintenance procedures and operations are being followed consistently.

Throughout this process, the potential property owners and buyers should be provided with materials that allow them to understand the importance and the maintenance of LID properties. Brochures, manuals, and fact sheets on BMPs, pollution prevention, proper construction measures, car and lawn care, water conservation, and property management should be distributed during each phase of the process. Such outreach information is usually available from county or state environmental agencies.

Other Programs. In 1999, the city of Chicago began its Urban Heat Island Reduction Initiative, aimed at reducing urban air temperature and pollution and beautifying the downtown area. As a secondary benefit, the practices used in this program also benefit storm water runoff. The city is using light-colored rooftops, creating rooftop gardens, planting trees in areas without existing trees, and replacing asphalt with porous pavement (USEPA, 2000). More examples of successful implementation of LID practices can be found at the Low Impact Development Center's web site at www.lowimpactdevelopment.org.

Effectiveness

Because LID is a relatively new concept, its effectiveness with respect to water quality improvement and water quantity reduction is largely untested. Many of the practices associated with LID, such as bioretention swales, dry wells, filter and buffer strips, and infiltration trenches, have been evaluated with respect to pollutant removal and hydrologic control, as shown in Tables 1 and 2.

Table 1. Reported pollutant removal efficiencies of LID practices (Prince George's County, Maryland, 2000).

Practice	TSS ^a	Total P ^a	Total N ^a	Zinc	Lead	BOD ^a	Bacteria
Bioretention Swales	-	81	43	99	99	-	-
Dry Wells	80-100	40-60	40-60	80-100	80-100	60-80	60-80
Infiltration Trenches	80-100	40-60	40-60	80-100	80-100	60-80	60-80
Filter and Buffer Strips	20-100	0-60	0-60	20-100	20-100	0-80	-
Vegetated Swales	30-65	10-25	0-15	20-50	20-50	-	Neg.
Infiltration Swales	90	65	50	80-90	80-90	-	-
Wet Swales	80	20	40	40-70	40-70	-	-
Rain Barrels	NA	NA	NA	NA	NA	NA	NA
Cisterns	NA	NA	NA	NA	NA	NA	NA

^aTSS=total suspended solids; Total P=total phosphorus; Total N=total nitrogen; BOD=biological oxygen demand

Table 2. Hydrologic functions of LID practices (Prince George's County, Maryland, 2000).

Hydrologic Functions ^a	Bioretention Swales	Dry Wells	Filter and Buffer Strips	Grass Swales	Rain Barrels	Cisterns	Infiltration Trenches
Interception	H	N	H	M	N	N	N
Depression Storage	H	N	H	H	N	N	M
Infiltration	H	H	M	M	N	N	H
Groundwater Recharge	H	H	M	M	N	N	H
Runoff Volume	H	H	M	M	L	M	H
Peak Discharge	M	L	L	M	M	M	M
Runoff Frequency	H	M	M	M	M	M	M
Water Quality	H	H	H	H	L	L	H
Base Flow	M	H	H	M	M	N	L
Stream Quality	H	H	H	M	N	L	H

^aH=high; M=medium; L=low; N=none

Benefits

The benefits of LID are many. First, it addresses hydrologic changes caused by development at the site level, which reduces the downstream impact of increased imperviousness. Second, LID practices, when used in combination with each other and with traditional treatment practices such as regional retention ponds, reduce pollutant loading to receiving water bodies, as shown in Table 1. Third, many LID practices involve natural landscaping including the planting of trees, shrubs, and flower gardens--these elements enhance the aesthetics of the site and reduce mowing requirements. If the plants are wisely chosen from local species and locally grown stocks, watering and fertilizer requirements can be reduced because the plants are adapted to local climate conditions. Finally, careful regrading and well-sited depressional storage areas can improve overall site drainage, help prevent pooling and creation of mosquito-breeding habitat, and reduce both onsite and downstream flooding.

Limitations

LID can be applied at many different scales, from a simple bioretention swale at the low point of a home site to large-scale subdivision planning with narrow streets, conservative layouts, and multiple, integrated management practices. This flexibility allows watershed managers to be able to use LID at most new development sites. Some LID applications can be limited by existing development codes that dictate minimum street and sidewalk widths, pavement types, setbacks, and other design details. An excellent resource that deals with the issue of changing restrictive development rules is called *Better Site Design: A Handbook for Changing Development Rules in Your Community* (CWP, 1998).

Costs

The costs for the municipality to encourage homebuilders and developers to implement LID are dependent on how municipalities want to market LID. LID approaches could be added to the locality's comprehensive plan or design standards. The updating of these documents would have some costs associated with them. Information brochures, flyers, and posters could be displayed in the local planning office and in other areas of government buildings. To promote LID to developers, information seminars and meetings could be held, which involve costs associated with paying employees to conduct such sessions.

The costs associated with LID applications vary with the scope of the application. In some cases, costs for designing depressional storage and other LID elements can be incorporated in the general design costs. Additionally, depressional storage areas can be incorporated into the overall grading plan, yielding a neutral cost for these additional elements. Bioretention swales and other structural management practices cost more to install than their turf or pavement alternatives but cost-savings can be found over many years with reduced maintenance requirements relative to turf and pavement, as well as reduced costs of retaining and treating storm water.

References

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Pollution prevention programs for existing development

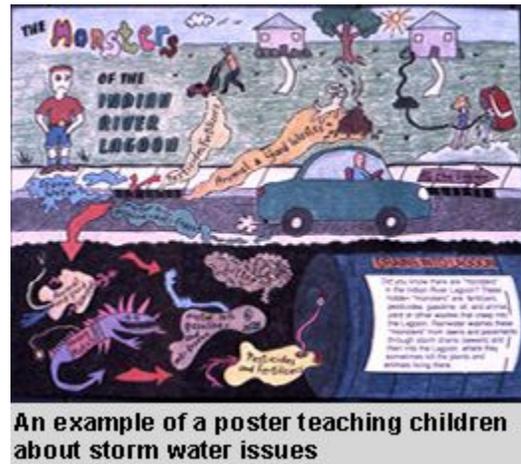
Educational Displays, Pamphlets, Booklets, and Utility Stuffers

Public Education and Outreach on Storm Water Impacts

Description

Printed materials are a common way to inform the public about storm water pollution. Some municipalities have a public relations department or a staff member that handles these types of outreach materials, whereas others contract with public relations firms and graphic designers to develop materials. Regardless of who actually produces the materials, municipalities should be creative when deciding which media to use and what types of messages are appropriate for those media. They also need to consider the following questions:

- Who is the audience? (i.e., general public, developers, homeowners?)
- How does the audience get its information? (i.e., newspaper, television, trade magazines, utility bills?)
- What knowledge base does the audience have?
- Does the audience need to be convinced about the importance of storm water pollution control?



These and other questions can guide municipalities in choosing the appropriate media and designing a message with the appropriate tone and level of information.

Some common printed materials include educational displays, pamphlets, booklets, and utility stuffers. Computer desktop publishing has made the production of many of these materials fun and easy. If money is tight, or there is limited access to a computer, attractive and effective materials using basic resources such as a photocopier, scissors, and glue can still be effective.

When designing the layout of a display, pamphlet, or flyer, the following issues should be considered:

- Restraint in design, consistency in artwork and graphic types, and quality materials are important factors because the audience should be invited into the materials with appealing, user-friendly layouts.
- The text should be kept to a minimum but still be interesting for readers.
- Using various formats and an active voice can make the text more engaging.
- Graphics--photos, logos, or other artwork--are great for breaking up long blocks of text, allowing readers a visual break.
- Images of lakes, streams, rivers, wetlands, and other storm water features are "naturals" for enhancing any printed material. The emotional appeal they elicit can be tremendous.

Applicability

Educational displays, pamphlets, booklets, and stuffers can be easily exhibited and distributed to a large population. They can be made using simple materials and graphics, or they can be made more elaborate. Furthermore, these displays can be made for any and all age levels, in any language, or for specific audiences.

Implementation

Educational Displays. Educational displays can be an effective way to convey information regarding a storm water pollution reduction campaign or program. These materials can be displayed at the following venues:

- Conferences.
- Seminars.
- Libraries.
- Outdoor events.
- Schools.
- Other community events.

These places provide an excellent opportunity for sharing information, educating and involving citizens, promoting volunteerism, and building general awareness.

Municipalities can elect to purchase a popup display and contract with an artist to design it, or they can design it in house. The displays should be visibly pleasing as well as informative. The overall design of the display should attract attention, draw the viewer in, and lead the eye throughout. Whenever possible, the display should be staffed to offer further explanation and answer questions.

Displays can be constructed from wood, cardboard, poster board, or other heavy material, but they are usually designed to be easily put together and dismantled, as well as being portable. Wooden displays (with metal hinges) have the advantage of longevity, but they can also be heavy. Commonly displays are made of foam board, which is relatively inexpensive and both lighter in weight and more durable than poster board.

When composing any large-format display, the entire display space should be treated as if it were a page layout, a photograph, or a painting. The same basic elements of composition governing good design and flow apply. The following considerations should be made when designing an educational display:

- A common mistake in preparing a display is the tendency to place many small items in a big space.
- If the project requires distributing a lot of information, a separate informative piece, such as an illustrated fact sheet, flyer, or brochure can be included to convey the details of the project.
- Whenever possible, it is better to "show" than "tell."
- A variety of photos, drawings, charts, and text should be included.
- Different fabrics or papers can be placed over the backdrop of the display to add texture. For example, if a display highlights a storm water stenciling project, a stream can be used as a backdrop and photos of stencil volunteers and a stenciled message can be included.
- Most importantly, the focus should be on the objective of the display, why it is being presented, what message it is intended to deliver and to which audience, and what it is trying to accomplish.

Pamphlets and Booklets. Pamphlets, booklets, and brochures are an effective way to present and explain a storm water message. Unlike many other communication vehicles, pamphlets and booklets can be distributed in many places without requiring someone to staff them. Racks of pamphlets can be set up at libraries, schools, offices, and fairs. They can be passed out at meetings and used in a direct mail campaign. Before creating a pamphlet or booklet, it is important to think through the purpose of the piece and its intended audience. It might be intended to solicit interest in a specific storm water event or activity, or to promote storm water education and positive behaviors. The purpose will significantly define the appearance and content.

Flyers. In addition to a booklet or pamphlet, a one-page flyer can be produced to carry the basic message. A short, to-the-point flyer is essential as the primary education tool for programs with a small budget. Commonly, flyers list the basic do's and don'ts of water pollution and list the top 10 actions the public should take against storm water pollution. The flyer should contain the basic "bare bones" list of information the public needs to know. The flyer should be designed to be easily reproduced for newspapers and newsletters (black-and-white and reproducible by copy machine), a major venue for communicating with the public. The flyer can be designed as a self-mailer; as funds become available, it can be expanded into a poster, calendar, or booklet.

Utility Stuffers. As with pamphlets, booklets, and flyers, utility stuffers offer an inexpensive, convenient way to convey the message to a large audience. However, instead of being targeted at a specific audience, utility stuffers must be appropriate for the public. These inserts can be extremely effective if they are engaging, concise, and memorable. They are often used to impart brief, important messages, provide overviews of the problems and solutions, or implore simple actions. When designing the insert, explore options regarding paper and ink colors, type faces, and type sizes; the text should be kept brief, the letters fairly large, and the design attractive. Special care should be taken to ensure that the message is simple, concisely written, and tells the reader why this issue is important to them.

Signs and Billboards. Striking graphics and brief but strong messages about storm water pollution can make a real impact on billboards along busy roadsides. These messages can be watershed-specific to remind citizens of the specific resource they are protecting. Additionally, signs with storm water pollution information can be posted on bridges, along roadsides, and at parks. For example, Michigan community installed a water monitoring gauge and interpretive display panel on a downtown pedestrian bridge (Grand Traverse Bay Watershed Initiative, no date). Storm water information could easily be added to this display. Signs intended for pedestrians can contain more information, but text should still be kept at a minimum to hold the audience's interest.

Benefits

Each of these types of material is versatile and can be tailored to many different types of audiences. A brochure can be written for the general public and later edited so that it reaches individuals within the storm water industry. These materials can be relatively inexpensive and can reach large groups of people, especially when displayed in public places (e.g., public libraries).

Limitations

Care must be taken to ensure that the message is easily understood by the targeted audience. Another limitation is the cost of designing, producing, copying, and displaying the materials.

Costs

Costs vary among printed outreach materials. Among other factors, the size, shape, detail, and amount of color on materials can vary widely. When preparing the budget, contact individual vendors for more accurate production cost figures. Staff time for planning, designing, and distributing the materials will also need to be budgeted.

References

COSG. No date. *Getting in Step--A Guide to Effective Outreach in Your Watershed*. The Council of State Governments, Lexington, KY.

Environmental Health Coalition. 1992. *How to Create a Storm Water Pollution Prevention Campaign*. Environmental Health Coalition, San Diego, CA.

Grand Traverse Bay Watershed Initiative. Contact Christopher Wright, 1102 Cass Street, Suite B, Traverse City, MI 49684, or e-mail to gtbwi@traverse.com.

Using the Media

Public Education, and Outreach on Storm Water Impacts

Description

The media can be strong allies to a storm water pollution prevention campaign in educating the public about storm water issues. Through the media, a program can educate targeted or mass audiences about problems and solutions, build support for remediation and retrofit projects, or generate awareness and interest in storm water management. Best of all, packaging a storm water message as a news story is virtually free! Surveys repeatedly show high interest among the public in environmental issues, and water quality--particularly as it relates to drinking water and recreation--rates very high. Reporters are always looking for informative articles, features, or columns to fill their pages or broadcasts. As with many public education activities, it is important to do some preliminary work to refine your message and target your audience to ensure that you deliver the most effective message.



Television can be an effective means of informing the public about storm water problems and outreach events

Applicability

Delivering educational, promotional, or motivational messages through the news media is similar to distributing them through other channels. For best results, the message should be repeated periodically and linked to something the audience values. Coverage of watershed issues from several different angles can help to accomplish this. News is the lifeblood of the media, so the message must be packaged to attract coverage. Orienting the message to the workings of the media and the needs of reporters will help keep the message focused and effective.

Implementation

The following are some of the ways storm water news and educational materials can be communicated by the media.

Newspapers and Magazines. Newspapers are powerful vehicles for delivering educational information, policy analyses, public notices, and other messages. Many displays at watershed seminars proudly post newspaper articles on the projects being presented in recognition of the importance and impact of newspaper coverage. Published news articles are almost always longer and more analytical than television stories, and they can be read by several people at their own leisure without the "hit or miss" nature of broadcasts. Graphics such as photos, charts, and tables can provide added perspective to published stories and can deliver complex information on trends or other data in an easily understood format. Public access to newspapers is usually excellent; no specialized equipment is needed. In addition, the vast need for new articles to fill pages of a daily newspaper means reporters may be particularly interested in covering storm water issues.

Newspapers can be accessed in several ways. Depending on the message or event, the appropriate format might be a news release, news advisory, query letter, letter to the editor, or (for urgent, timely information) a news conference.

It is important to obtain information on deadlines. In some cases, it might be more strategic to place an ad in a weekend paper, if circulation is stronger on the weekends. Also there might be certain times of the year when fewer stories or ads are purchased, which would make any ad or story more prominent.

Magazines. Magazines, like newspapers, allow for greater length and analysis than television and provide the additional benefit of targeting specific audiences (e.g., landscapers, automobile mechanics, farmers, or recreationists). It is also important to follow the news on a regular basis. If a magazine will be covering an article on storm water in an upcoming issue, an ad in that issue would be even more appropriate. However, unless a magazine is local, it is unlikely that an article relating to storm water will reach the correct audience.

Radio. In spite of the popularity of video, radio remains a strong media contender due to its affordable production costs and creative possibilities. Further, commuters who drive to work spend much time in their vehicles. Radio is everywhere and nearly everyone hears it at some time or some place every day. Of course, those same universal qualities are what dilute its impact as well, since radio can become background noise. The message must be repeated often to reach listeners at various times. To saturate whole markets, the message should be distributed to many stations.

Local radio stations often have feature programs, but they do not cover news in depth. Public stations may devote more time to news or educational programs, but might not reach the target audience. To make sure the targeted audience is reached through radio, match the message to the type of format of the station. Radio has format varieties ranging from musical selections of metal and rock to country and jazz, as well as talk formats. Although the extremely short nature of spot news coverage on radio does not lend itself well to deep analysis and lengthy information delivery, radio can play a valuable role in reinforcing other outreach efforts conducted among specific audiences.

When preparing for a radio spot, it is important to get right to the central point of the project, because airtime is short. To minimize production costs, scripts should be prepared and sent in for live radio. Typed and double-spaced copy is required for community calendars and other public notice programs. The ad's release can be tied to a special day or event (such as Earth Day), and updating it with different angles later will improve its effectiveness. Scripts should be written for listening, and submissions should be supported with follow-up calls or letters, or even promotional items like posters.

Television. Television is the primary source of news for the majority of the population, and local reporters are generally interested in covering environmental stories that pertain to their area. Television news stories tend to focus on people and therefore must be engaging and compelling. Issues will attract television coverage if they

- Involve local people or issues.
- Focus on unique or unusual attributes.
- Affect many people throughout a region.
- Involve controversy or strong emotions.

News Conferences. To heighten awareness of some breaking information or an event that is too important for a news release, a news conference might be appropriate. Two days before the conference, a media advisory should be sent to all news outlets in the area and should be followed up with a phone call to confirm attendance and answer any questions. Typically a news conference begins with distribution of a news release that contains the reason for the conference, informative quotes from people involved in the issue, and contact information. A moderator then makes a few welcoming/introductory remarks and introduces other speakers or makes a statement (which is often read). Remarks by all speakers should be carefully prepared. The floor is then opened for questions, which can usually be anticipated and prepared for beforehand. After the conference, a news release is sent to media members who did not attend.

When preparing for a planned event (such as river cleanup or storm drain stenciling), a news advisory can be sent to local stations. Every advisory should include a description of the event, when and where it will take place, who will participate, and a phone number for someone who can be contacted for more information. The press advisory can be sent 1 or 2 weeks before the event occurs and should include the name of the organization, a contact name, and the reason for calling. If reporters do not show up at the event, a follow-up news release can be sent immediately afterward so the event can still be covered.

Public Service Announcements. Public service announcements (PSAs) can be a very successful outreach approach if they are well broadcast. Newspapers will list PSAs for events or activities that are either free of charge or sponsored by nonprofit organizations. Radio stations will run PSAs that they think are of interest to their audiences. Information on an activity such as a watershed festival, storm drain stenciling, or river cleanup, or pollution hotline numbers, would make good PSAs. Although radio PSAs are free, they sometimes air late at night or very early in the morning (which might make it difficult to reach the target audience). Television PSAs can be highly effective if aired on selected stations at appropriate times for the audience. All PSA information should be submitted at least one month in advance. If a municipality has not prepared a PSA in the past, it is advisable to seek advice from another agency or to use a professional company to help in preparing PSAs.

Internet Message. Increasingly, the Internet is becoming a powerful means of communication. It provides worldwide access to hundreds of thousands of sites containing millions of documents, chat rooms for special interest groups, and incredible database/mapping features. Because the World Wide Web is used regularly and extensively by agency personnel, environmental group leaders, and the business community, it can be a valuable tool in conveying a storm water pollution message. However, average citizens still get the great bulk of their environmental messages from more traditional venues. Additionally, a Web-based message is geared toward a specific audience that is "connected" and perhaps already attuned to the cause and its objectives.

If the municipality already has a web site, storm water information can be posted on it. Information should be placed on the page of the department that handles storm water and on any other relevant department's page. If there is enough interest, the department can develop an automated e-mail address list (list server), which is a very inexpensive means of disseminating information to interested parties. Some active storm water programs may find it useful to establish an e-mail list server to keep participants updated on meetings, policy discussions, and other matters. A list server is simply a distribution list recorded in an e-mail account, which allows a message to be sent to everyone on the list at once. Implementing this communication link is simple and allows stakeholders to keep informed of developments at their leisure. E-mail is the preferred communication medium among many citizens, business people, and agency officials, because it can be accessed at convenient times and provides a written record of the communication.

There are opportunities to reach particular audiences (e.g., recreational fisherman, automobile mechanics, farmers) via the Internet through interest group Web sites. However, along with citizens of the watershed involved, national audiences may also be reached through these Web sites. Explore these sites before deciding to use them in the outreach program. The Internet will likely become more important to local watershed outreach efforts in the future.

San Diego County Successfully Partners with the Media. San Diego County's Environmental Health Coalition (EHC) used the media several times during its storm water pollution prevention program. PSAs were put in newspapers for EHC's collection event in the watershed, and a media kit on urban runoff was developed. In addition, the coalition held two news conferences. The first news conference was called to announce the release of the Chollas Creek Watershed Protection Calendar, which involved a competition for page designs. It was held aboard a cruise ship and featured the winning student artists and posters. After the conference, all participants were invited to remain aboard for a tour of San Diego Bay, which is the resource the Coalition is trying to protect. The event was covered by the leading local TV station.

The second event was for the release of a media kit on urban runoff and was attended by a state senator and representatives of the Surfrider Foundation. Storm drains near the San Diego County Administration Building were stenciled. All major media covered the conference. EHC's media kit was funded by the city of San Diego.

Neighborhood Association Newsletters. Many neighborhood and homeowner associations regularly publish newsletters. Adding information about storm water, especially how individuals can help, would target specific areas and would increase a sense of acting locally. Oftentimes, such associations are looking for new topics and speakers for club events.

Benefits

There are obvious benefits to using the media to inform people of storm water events and issues. In some cases, such as in public service announcements, there is no cost involved. Using the media can help spread the message beyond the local area. To be the most successful outreach program possible, at least one staff member should become a media expert for future press releases, ads, and other projects.

Costs

Working with the media is essentially free, but not always. News releases and articles are free of charge. Newspaper, radio, and PSAs are also typically available at no cost although there may be a fee to run PSAs on certain television stations. Local stations should be contacted before submitting a PSA for cost estimates. Running an Internet message on an existing web site is cost-free. If a new site is posted, there might be charges from the Internet host company.

References

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Promotional Giveaways

Public Education, and Outreach on Storm Water Impacts

Description

Once a storm water education and outreach program has been developed, it can be marketed through promotional giveaways. Promotional giveaways are small tokens with storm water education slogans and graphics. They are free items given to people to help them become aware of environmental issues.

Applicability

Promotional giveaways are an effective means of promoting storm water organizations, simple actions, and general awareness. A number of items, such as posters, calendars, frisbees, magnets, key chains, tote bags, coffee mugs, bumper stickers, and baseball caps, are appropriate promotional items. When choosing a giveaway item, it is important to consider the cost (items such as T-shirts and hats are relatively expensive) as well as the alternative message it might send. For example, a frisbee might conflict with a campaign to reduce plastic waste.



Some examples of storm water promotional give-aways

Implementation

When designing promotional items, a professional printer can be consulted to make sure the design can be reproduced effectively, inexpensively, and on a number of different materials. The design theme or logo should be carried throughout all printed materials and accessory items. Consideration should be given as to the types of products to use. For example, if using mugs, a strong, clear design should be selected and the mug should be dishwasher-safe. The cost of packaging, mailing, and distributing the items should be considered; advertising specialty companies can be consulted for ordering in quantity to reduce costs. Finally, plenty of time should be allowed for design, production, printing, and distribution of promotional items.

The products should be publicized and a program can be developed to market and distribute them. Promotional items can be distributed through a number of venues, including watershed festivals, conferences, seminars, outdoor events, and schools. They can also accompany displays and act as rewards and incentives for participation in storm water pollution activities, such as storm drain stenciling projects. The following are some promotional items that can be used:

Posters. Posters can be an excellent option for message delivery and can be displayed widely for months or even years. Text, photos, slogans--even graphs--can be presented effectively on posters. However, they are mostly used to build awareness ("Save the Bay") or deliver a simple message ("You Drink What You Dump"). Unfortunately, production and distribution can be costly. Mailing tubes and postage can cost as much as the poster itself. Folding and mailing in large envelopes causes creases that detract from the appearance. However, if the poster design is exceptionally good, a larger or fancier version can be sold, which will help to cover production costs.

When designing the poster, the focus should be on the objective, the target audience, and the message it is to convey. Large, bold graphics (photos, artwork, etc.) will attract attention and the graphic elements should immediately convey the poster's message. Color can greatly enhance a poster, but it also increases production costs. One or two-color posters can be sufficiently attractive if they're designed well. In general, a catchy slogan or theme should be used. A slogan, photo, or design contest is a good way to obtain original artwork, or local artists can be used to create the graphics. This approach gives the poster local credibility and it supports the arts in the community. The desired size should be economical and the poster should fit into a mailer tube. Using a standard poster size is best because it is cheaper to print and is easier to obtain a frame for the poster.

Posters displayed in the community should be placed in protected and visible areas. They can be displayed in libraries, union halls, businesses, schools, recreation centers, community colleges, and any other place people gather. If the program is planning a special watershed event, the poster could promote the event. Businesses might be willing to display the poster for the event to encourage people to attend. Posters could also be given away at the event as prizes or mementos.

Bumper Stickers. Bumper stickers are highly individualized traveling billboards. Since Americans spend so much time on the road, bumper stickers offer an excellent opportunity to expose a message. A bumper sticker message should be brief, positive, and focused on the objective (e.g. "Save Our Lake"). Composition is easy--just combine a catchy message with a piece of art and it is all set! Remember to use large, bold type and keep graphics simple and easily recognizable. Check popular sizes before finalizing the design and attach a mock-up to a bumper to ensure readability. Make sure the design can be seen from a distance and the color is attractive without hindering readability.

T-Shirts and Caps. T-shirts and caps are popular items that offer high exposure to help spread the message. Simple patterns, such as a slogan and a logo or small icons work best. The watershed or region name should be included as well. Since dated materials are harder to sell after the fact, the design should be kept "timeless." Most people prefer 100-percent cotton shirts over blends and large and extra-large are the most popular sizes. Long-sleeved varieties are popular in cooler climates. When ordering the merchandise, quantities should be carefully estimated to avoid overstocks. Several suppliers should be contacted for quotes before choosing a manufacturer. Although they can be highly effective, T-shirts and hats can be relatively costly and rarely cover their production costs with sales. Production options include contracting a print shop, silk-screening T-shirts, and stenciling T-shirts in a garage.

Calendars. Calendars can be colorful, year-long reminders to protect water quality and prevent pollution. The message on each page stays in front of the target audience for a month at a time, and everyone uses them. Other environmental or community messages can be integrated into the calendar for appeal to a wider audience. If students are the target audience, a calendar based on the school year might be preferable. Some groups custom-tailor their calendar and turn it into a log of activities for the watershed, lake, or stream. People can keep track of the year's observable water events, ice-outs and freeze-up, flood events, waterfowl migrations and nestings, mammal sightings, insect hatchings, and the like.

If colorful, calendars can be expensive to produce. Moreover, they are also time-sensitive and cannot be used in future years (except for decoration). It is wise to plan for distribution to hit the market around November (when everyone is shopping for next year's calendar).

Other Items. Any number of items can be customized with a storm water pollution logo and message, including magnets, frisbees, stickers, and bags. When choosing which items to purchase, keep in mind the objectives to be accomplished. For example, magnets can be excellent for conveying storm water pollution hotlines. They can be kept handy on the refrigerator near a kitchen phone and are relatively inexpensive to produce. Key chains are also good for hotline numbers or other brief messages. Prices naturally go down with quantity, but the supply should be distributed within a reasonable amount of time.

Effectiveness

Most people will take anything that is free. The key to making promotion items effective is to make them something people can use and want. For example, key chains with a slogan can be used everyday. They are easily identifiable and might be seen by others.

Benefits

People appreciate promotional items, especially at voluntary activities. Not only do the freebies help promote an issue, but they also serve as a "thank you" to the volunteers. In addition, there is a lot of room for creativity and fun when making these items.

Limitations

The limitations of promotional items are the costs and time associated with making them. Also, there is no assurance that a free T-shirt will result in another volunteer or supporter of storm water issues.

Cost

The cost of promotional items will depend on what is being produced and how many. Generally, buying larger numbers of an item will reduce unit costs. However, it is not wise to buy so many items that it will be impossible to resell them or even give them all away. The objectives as well as the target audience should be considered when ordering. Some costs for various outreach materials are provided in Table 1, but these are only estimates. Individual vendors should be contacted when preparing the budget.

Table 1. Estimated costs for promotional items (Source: COSG, no date)

Item	Cost	Description
Magnets	\$0.23 each for a quantity of 1,000	two-color, business card size
Canvas tote bags	\$2.20 each for a quantity of 1,000	one-color, two-sided
Stickers	\$0.07 each for a quantity of 1,000	one-color, 3-inch circle
Frisbees	\$0.68 each for a quantity of 1,000	8-inch
Posters	\$2.50 each for a quantity of 5,000	4-color, 11 inch X 17 inch folded
Pens	\$0.59 each for a quantity of 5,000	ballpoint, one-color, capped
Mugs	\$1.00 each for a quantity of 1,000	one color on solid standard mug
Caps	\$5.00 each for a quantity of 6,000	or less embroidery on cotton twill
T-shirts	\$2.50 each for a quantity of 1,000	500 large and 500 extra large, single color on white, silk screen
Lapel pins	\$1.38 each for a quantity of 1,000	

References

Environmental Health Coalition. 1992. *How to Create a Storm Water Pollution Prevention Campaign*. Environmental Health Coalition, San Diego, CA.

The Council of State Governments. No date. *Getting in Step A Guide to Effective Outreach in Your Watershed*. The Council of State Governments, Lexington, KY.

Pollution Prevention For Businesses

Public Education and Outreach on Storm Water Impacts

Description

Pollution prevention (P2) is the combination of activities that reduce or eliminate the amount of chemical contaminants at the source of production or prevent this waste from entering the environment or waste stream. P2 occurs when raw materials, water energy, and other resources are used more efficiently, when less harmful substances are substituted for hazardous ones, and when toxic substances are eliminated from the production process. P2 can be accomplished through such methods as source reduction, reuse/recycling, and energy recovery. Source reduction is the preferred method of P2 and allows for the most significant improvements in environmental protection by avoiding the generation of waste. Reuse/recycling and energy recovery also are effective means of P2.



Applicability

P2 plans take many forms but are applicable to almost every community and industry sector. Municipalities should educate business owners to plan and implement a P2 program. However, before implementing a P2 plan, it is important to evaluate the businesses in your community to determine the most efficient and effective plan. Attending or planning a P2 conference or becoming a member of a P2 organization with other communities can spur networking and information sharing. In addition, businesses in your community can frequently increase their publicity, recognition, and patronage through being a member of such P2 organizations.

Implementation

P2 in your community can be accomplished through methods such as source reduction, reuse/recycling, and energy recovery. While there is no one plan that fits all, many of these methods can be implemented anywhere.

Source Reduction.

- Incorporating environmental considerations into the designing of products, buildings, and manufacturing systems enables them to be more resource efficient.
- Rethinking daily operations and maintenance activities can help industries eliminate wasteful management practices that increase costs and cause pollution.
- Controlling the amount of water used in cleaning or manufacturing can produce less wastewater.
- Re-engineering and redesigning a facility or certain operation can take advantage of newer, cleaner and more efficient process equipment.
- Buying the correct amount of raw material will decrease the amount of excess materials that are discarded (for example, paints that have a specified shelf life).

Reuse/Recycling.

- Using alternative materials for cleaning, coating, lubrication, and other production processes can provide equivalent results while preventing costly hazardous waste generation, air emissions, and worker health risks.
- Using "green" products decreases the use of harmful or toxic chemicals (and are more energy efficient than other products).
- One company's waste may be another company's raw materials. Finding markets for waste can reduce solid waste, lessen consumption of virgin resources, increase income for sellers, and provide an economical resource supply for the buyers.

Energy Recovery.

- Using energy, water, and other production inputs more efficiently keeps air and water clean, reduces emissions of greenhouse gases, cuts operating costs, and improves productivity.

In order to assist the businesses in your community in implementing these techniques, a local government can create and maintain a database of local government information on P2. In addition, a community can prepare and distribute a Pollution Prevention Week Planning Guide that will educate businesses in your community about these techniques.

Benefits

Adopting a P2 plan can benefit your community both environmentally and economically. P2's health and environmental benefits include cleaner air and water, fewer greenhouse gas emissions, less toxic waste to manage, less solid waste going to landfills, greater workplace safety, and better stewardship of natural resources. This can also lead to a reduction in workplace exposures to hazardous materials, which can affect workers' health and productivity.

P2's economic benefits include greater business efficiency, increased competitiveness, and reduced costs for regulatory monitoring and compliance. By preventing the generation of waste, P2 can also reduce or eliminate long term liabilities, clean-up, storage, and disposal costs. Finally, by preventing pollution there is a greater likelihood that a company will be in compliance with local, state, and federal statutes.

Limitations

It is important for a municipality to provide clear guidance to business owners for pollution prevention to be effective. Although a new pollution prevention program may require initial investments of time and money, by clearly outlining the benefits of a pollution plan, you encourage the businesses in your community to adopt such a plan. It might also be difficult to understand the importance of a P2 program. At first, the costs to start such a program could look high, but keep in mind that prevention can lead to financial gains.

Effectiveness

As previously stated, a P2 plan can benefit your community both economically and environmentally. P2 can reduce pollution discharges from businesses in your community and decrease the cost of their operations. For example, vehicle washing produces chemicals, dirt, and grease, which find their way untreated into waterways. However, a tour company in Seattle installed a collection system that recycles approximately 92 percent of water used for bus washing. The company has reduced wastewater discharges and, as a result, has cut its water bill by approximately \$1,000/month during the peak season. In addition, a container company that installed a closed-loop water recycling system has reduced water consumption in its freight container washing operations by approximately two-thirds. (National Pollution Prevention Roundtable, 2000).

Costs

The costs for a municipality to implement or expand a P2 program vary. Costs to initiate a program may be significant due to education, training, and infrastructure investments. However, these costs vary with the type of business and with the extent to which the pollution plan is implemented. There are programs currently being implemented nationwide on a variety of scales.

Santa Clara County, California, has implemented a Pollution Prevention Program aimed at providing technical assistance through workshops, periodic newsletters, and fact sheets, and by implementing a Green Business Program. This program uses three full-time employees (FTE) and has an annual budget of approximately \$300,000.

The City of Boulder, Colorado, has implemented Partners for a Clean Environment (PACE) that is a voluntary, non-regulatory program which offers free pollution prevention education, technical assistance, and recognition to Boulder County businesses. PACE staff identifies P2 outreach needs, compiles information, and motivates businesses to reduce emissions and waste voluntarily. PACE staff estimates that in 1999, participating businesses reduced air emissions by 25 tons/year, hazardous waste by approximately 3,900 gallons/year, wastewater discharges by over 35,000 gallons/year, and solid waste by over 630 tons/year. This P2 program uses approximately 1.5 FTEs and has an annual budget of \$58,000.

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